

E & A

27 no. 2

**FEBRUARY
1959**

PEST CONTROL

Two years in the making, here's the complete

Text of FHA MPS for Termites . . . Pg. 9

What to do; Whom to see; What to say

How to Sell Builders . . . Pg. 17

Idle labor, building delays, no water: Problems of this TO who

Pretreats 1,100 Navy Units . . . Pg. 19

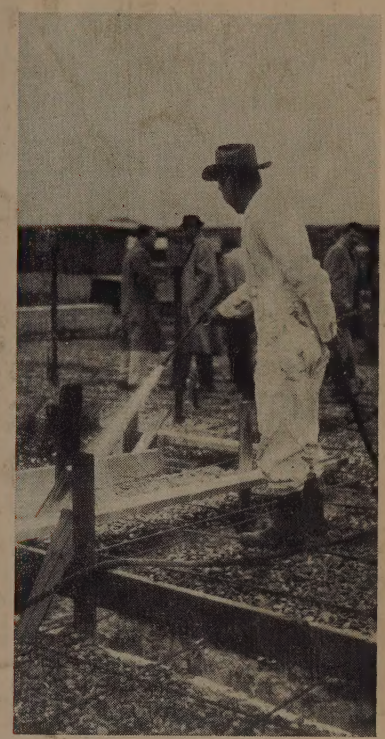
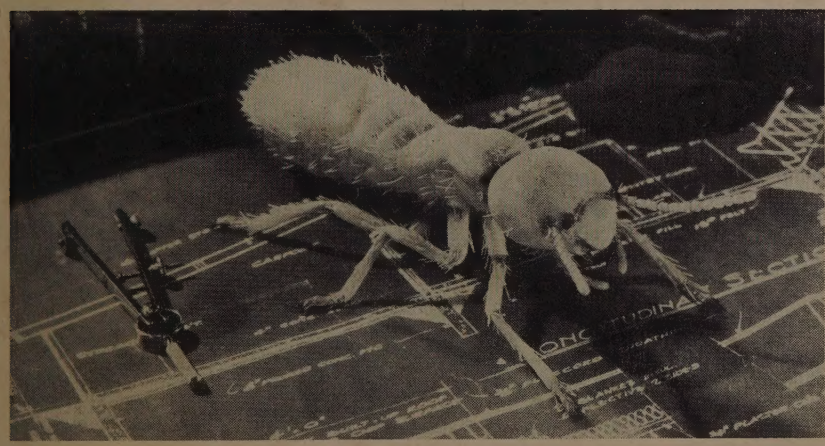
Possibilities of resistance to newest insecticides

VPI's Latest on Roaches . . . Pg. 26

To get termite soil chemicals to stay put,

TO Must Know Soils . . . Pg. 29

Photo, courtesy Koppers Co.



Stinging Insects . . .Pg. 25

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Don't Let Costs Get You Pg. 48

Orkin to Appeal Suit . .Pg. 52

Cold-Blooded Termites .Pg. 61

**Monthly Magazine of Methods Chemicals and Equipment for
Urban and Industrial Pest Control and Sanitation Since 1933**

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business
2 ways with the*

1959

CHLORDANE

PCO

**"BUSINESS BUILDER"
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The materials included in the "Business Builder" Program are adapted to the most commonly used methods of local advertising. All of the materials are free. Although the materials would represent a large investment if they were prepared by an individual pest control company, you will find them economical to use. The only expense involved will be the postage, time, or space needed to reach prospects in your locality. This program represents Velsicol Chemical Corporation's faith in the future of the pest control industry. We sincerely hope that you will use it to build your business in 1959. Sign up for this program today!

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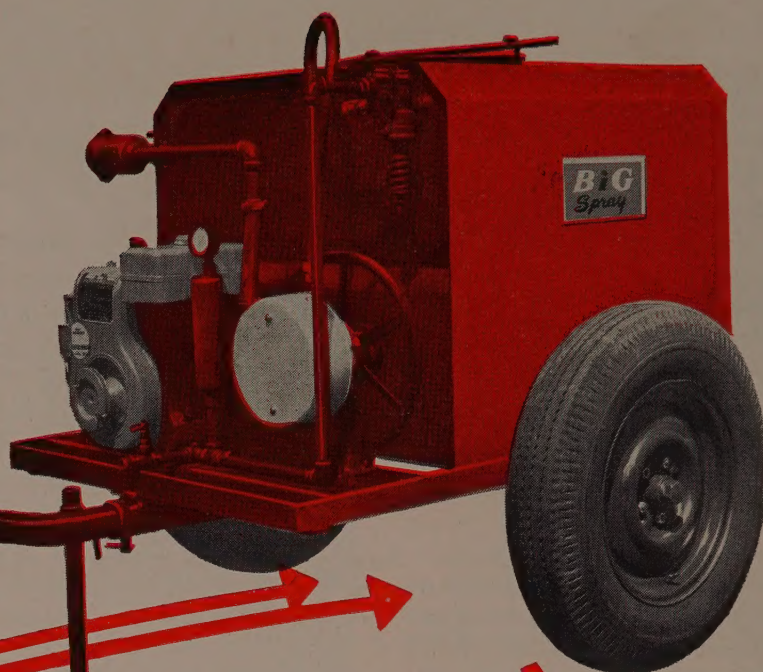
PC 29



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Editor and Publisher
JAMES A. NELSONAssistant Editor
PHIL OSBORNECirculation Manager
R. J. HOFFERAdvertising Staff
National Promotion
RICHARD G. FARRELL
East Coast
THEODORE RIEDEBURG
West Coast
JAMES E. MUNFORD CO.Published Monthly by
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New York
Theodore Riedeburg & Associates
415 Lexington Avenue
Phone: MUrray Hill 7-1488California
James E. Munford Co.
South Pasadena
1425 Mission St.
Phone: RYan 1-3397San Francisco
420 Market Street
Phone: DOuglas 2-3899

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Cooperating with



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What Are Secrets?

With all due respect to the courts of our land, their interpretations may sometimes be questioned. Some are now questioning Judge Pat Cannon's recent blanket definition of what is "secret" in the pest control business.

In a decision handed down last December (see pg. 52), Judge Cannon of Dade County, Florida Circuit Court lumped the "methods and systems" of a pest control company with the "names of its customers, addresses and prices" to explain why this business "requires secrecy."

No one will quarrel with the undisputed right of any company to keep its charges and the names and addresses of its customers "secret." But if "methods and systems" include technical pest control information they should not be put in this same category.

For a quarter of a century the industry has been successfully lifting the veil of "secrecy" over pest control methods. Nearly every phase of a company's control procedure has been learned from someone else. Members of this industry, universities, government agencies and others have developed most of the techniques used by PCOs, techniques that are freely shared with the entire industry to improve its efficiency. Successful refinements developed by individual applicators will also eventually be shared with the industry as a whole.

If Judge Cannon's blanket interpretation of what is "secret" in the pest control industry includes technology, and establishes a precedent for other courts to follow, progress of technical advancement in this industry may have been set back at least ten years.

You get profit-performance with HUDSON Sprayers and Dusters



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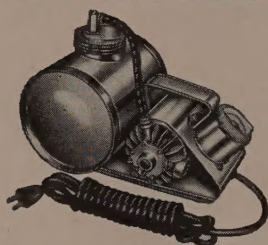
the X-Pert® compression sprayer...the sprayer that maintains selected nozzle pressure to apply pesticides most effectively, precisely, economically, profitably. Has every feature you need. In galvanized or stainless steel...4-, 3- and 2-gallon sizes.

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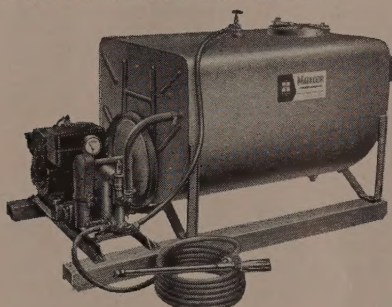


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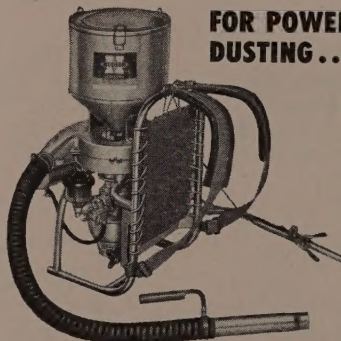
disinfectants, deodorants...the Rival® electric sprayer with time switch for unattended spraying. Fine for closed area treatment. Has 3-quart stainless steel container. Also the Wizard*, with 24-ounce graduated glass jar container. Discharges about an ounce per minute in fine fog.

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☐ Power sprayers ☐ Hand or ☐ power dusters

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Letters

Alien Termite Infests Houston Waterfront, Dr. Snyder Writes

Although termites not now occurring in the United States are intercepted from time to time by state or Federal governmental officials at various ports, only one species has become established, so far as is known. This is a destructive tropical subterranean termite (*Coptotermes*) which has been introduced from an infested drydock at Houston, Tex. to buildings along the waterfront. Efforts are being made to eradicate this termite, and it is hoped this introduction is only temporary.

When more is known of the status of *Coptotermes* and the results of control efforts, I shall be glad to prepare an article on this for your valuable magazine.

Sometimes these intercepted species of termites are very interesting, such as a new species (*Kaloterms nigrinus*), which I described in 1946 when it was intercepted in logs from Guatemala.

Each year I identify many such termites often found alive in cargo, baggage, etc. on boats, trains, or airplanes from foreign ports. This inspection is part of the work of the quarantine officials, and it is very important to keep these injurious intruders out of this country.

Dr. Thomas E. Snyder

Smithsonian Institution
Washington, D. C.

PC Helps Canadian Get Started

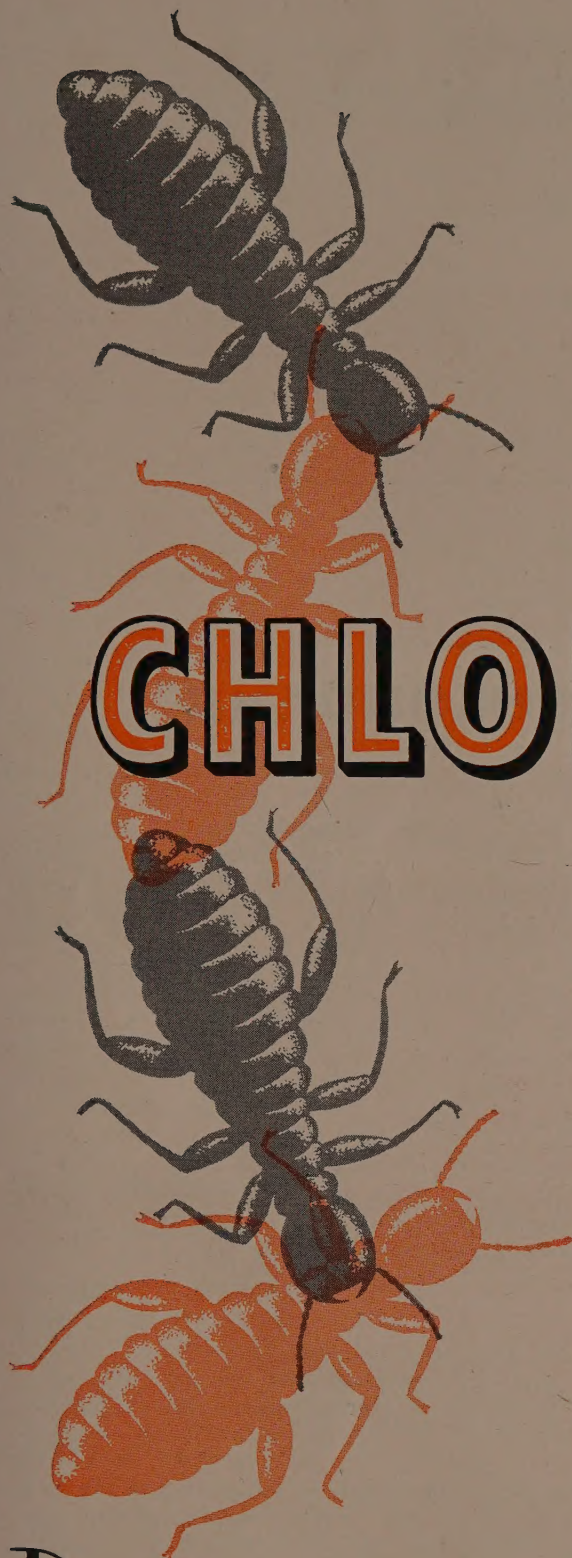
I would like to congratulate you for the terrific ability you continually display in making every issue of *Pest Control* so valuable and informative.

In the last ten months, *Pest Control* has been most helpful to me and my newly formed company.

Ted S. Bisanz

Ontario Exterminating &
Sanitation Service
Downsview, Ontario
Canada

Pest Control welcomes expressions of opinions from its readers. Send ideas and comments as briefly as possible to James A. Nelson, Editor, Pest Control, 1900 Euclid Avenue, Cleveland 15, Ohio.



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6. Economical

PRENTOX CHLORDANE is accepted as the most effective and versatile insecticide against termites. Tests have shown the protection period of **PRENTOX CHLORDANE** used as a soil treatment against termites is at least five years.

Prentiss' technical service staff will be glad to consult with you on your termite-control problems. Why not call or write today?



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Federal Housing Administration Minimum Property Standards



Copies of the complete 315-page MPS manual are now available for \$1.75 each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Send check or money order (no stamps) with your order and ask for "Minimum Property Standards for One and Two Living Units," FHA No. 300, Nov. 1, 1958. The provisions of these standards become effective early next month.

**Termite Protective Measures Must
Meet or Better These Criteria on
Federally-Financed Contracts as**

MPS Take Effect Next Month

After a three-year huddle with the Building Research Advisory Board, the National Pest Control Association and building trade groups, the Federal Housing Administration now has a new set of Minimum Property Standards. Since November, when the new MPS was published, FHA has been training its Chief Architects in the new standards, and acquainting its insuring offices, as well as local home builders associations, with the revised provisions.

Long awaited by the pest control industry, the revised MPS includes six pages devoted to the protection of property against termites. For the first time, this Federal agency recognizes the value of soil pretreatment as an acceptable form of termite prevention. As a consequence, the demand for professionally-applied soil poisoning will increase. The requirement of a five-year guarantee of effectiveness should turn prospective home owners and building contractors to established pest control firms which have the know-how, insurance, and equipment to apply soil chemicals properly and to guarantee the protection.

Below is a reprint of that section of the new MPS dealing with the protection of dwellings from termite attack. To acquaint PCOs with each of the five approved methods of termite protection included in this guide, the entire section is given.

SECTION 815

815-1 OBJECTIVE

To provide protection from damage by termites or decay by the application of suitable construction methods and control measures.

815-2 GENERAL

815-2.1 These standards apply to subterranean termite and decay control measures. In those areas where drywood or dampwood termites present a hazard, additional precautions may be required by the local FHA field office.

815-2.2 The control measures for protection against termites and decay outlined herein are predicated upon full compliance with equally important construction practices required in other sections. These practices include:

- Adequate drainage for the site and building.
- Minimum clearances between ground and wood.
- Adequate ventilation of structural spaces.
- Proper flashing.
- Installation of vapor barriers and sheathing paper, when required.

815-2.3 The acceptable termite protection measures listed in 815-3 serve as a physical or chemical bar-

rier and it is essential that free inspection of structural wood parts in substructure areas be made periodically. To assure this result, written notice shall be posted in the dwelling by the builder that termite protection has been provided by means of (name of method) and that semi-annual inspection should be made to detect the presence of any termites which have been driven into the open by the physical barrier or which may have breached the chemical barrier.

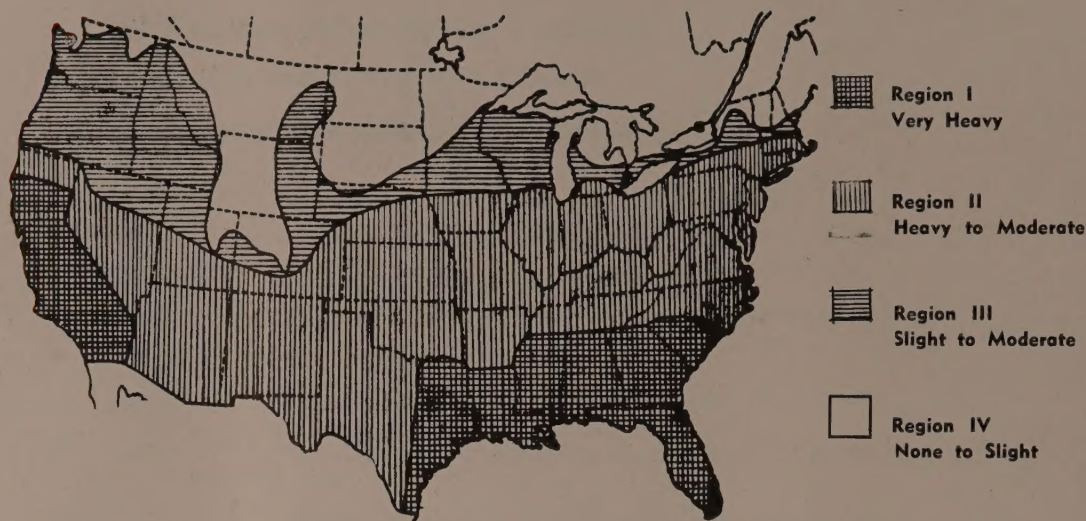
815-2.4 Garages, carports and porches—Protective measures required for the main structure shall also apply to attached garages and carports, any accessory buildings, and to porches attached to dwelling.

815-3 TERMITE PROTECTION

815-3.1 Provide protection against damage by termites in those areas where they are determined to be a hazard. See map, Geographic Distribution of Termite Infestation (pg. 10—Ed.). Application of termite protection shall be as follows:

- Region I, provide protection in all areas.
- Region II, provide protection in those areas required by FHA field office.
- Region III, protection not required except when

Geographic Distribution of Termite Infestation



specifically determined by FHA field office that a hazard exists in a particular area or locality.

d. Region IV, protection not required.

815-3.2 All stumps, roots, fallen timber and other wood or wood product debris shall be removed from building site before completion.

815-3.3 Concrete porch floors, entrance platforms, planters, fences, screens, or other appurtenances shall be separated from the main structure or be protected against entrance of termites.

815-3.4 Where termite protection is required it shall be provided by one or more of the following means:

- Concrete foundations.
- Metal shields.
- Reinforced concrete foundation caps.
- Soil treatment.
- Treated lumber.

815-3.5 Concrete Foundations

a. Installation and quality of concrete shall be such that walls shall be free of cracks or porous areas.

b. Concrete foundations cannot be considered as termite protection in:

- Slab-on-ground construction unless slab and foundation are placed integrally.
- Masonry or masonry veneer construction where the masonry facing or veneer extends below the top of the foundation wall and is less than 8 inches above finish grade.

815-3.6 Metal Shields

a. Materials—Galvanized iron or steel, terne plate, aluminum, copper, or zinc-copper alloy. Metal coated building paper shall not be used for shields.

b. Installation:

- Shield shall be installed continuous under wood sill plate, girders or other wood construc-

tion. In masonry or masonry veneer construction, shield shall extend through wall from interior to exterior. In concrete slab construction, shield shall extend from exterior into slab, embedded not less than 2 inches.

(2) In basementless construction or over masonry piers, shield shall extend at least 2 inches beyond inside face and be turned down at approximately 45 degree angle, at least 2 inches. In basements, shield shall be extended as above or be bent down at least two inches.

(3) Lock or solder seams entire length. Spot soldering not acceptable. Where anchor bolts pass through shield, seal penetration with coal-tar pitch or other materials acceptable to the U. S. Forest Service, U. S. Dept. of Agriculture.

(4) Piping, ductwork or other penetrations through concrete slabs shall be thoroughly sealed with coal-tar pitch or other acceptable materials. Asphalt shall not be used.

(5) Where metal shields are required in concrete slab construction, concrete slab shall be reinforced for temperature with at least 6x6-10/10 welded wire fabric.

c. Shields shall be uncovered and visible for inspection at the regular First or Intermediate inspection stages.

d. See Details 44 and 45 for examples of metal shields. (illustrations not included here—Ed.)

815-3.7 Reinforced Concrete Foundation Caps

a. Capping, for termite protection, shall be of concrete at least 4 inches thick.

b. Reinforce longitudinally with two No. 3 bars or equivalent. Reinforcing shall be placed so that concrete will completely surround steel.

c. Place continuous in one operation on top of all unit masonry foundation walls and piers. Capping shall be full width of wall and extend through

THE B & G SUB-SLAB INJECTOR

**GIVES YOU
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of Chemicals

AND POSITIVE TERMITE CONTROL



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Injector Only 23.50

Shut-off Only with 1/4" adapter and
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RESIDEX CORP.
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YORK CHEMICAL CO.
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voids in masonry veneer or faced masonry walls.
d. Concrete capping is not acceptable termite protection for slab-on-ground construction.

815-3.8 Soil Treatment

a. Chemicals and concentrations—To soil areas to be treated, apply one of the following chemicals at not less than the designated concentration:

Chemicals	Concentrations
Aldrin.....	0.5% applied in oil solution or water emulsion.
Benzene hexachloride.....	0.8% of gamma isomer applied in oil solution or water emulsion.
Chlordane.....	1.0% applied in oil solution or water emulsion.
Dieldrin.....	0.5% applied in oil solution or water emulsion.
DDT.....	8.0% in oil solution.
Lindane.....	0.8% in oil solution or water emulsion.
Trichlorobenzene.....	1 part to 3 parts oil.

Note:

(1) Other materials may be used provided:

(a) They are determined to be acceptable by the FHA, Architectural Standards Division, Washington, D. C.; or,

(b) They meet a 5 year test conducted by the U. S. Forest Service, U. S. Dept. of Agriculture; or

(c) They contain one or more of the above mentioned chemicals in the concentrations recommended.

(d) In all cases, evidence is provided that no toxic effects to humans, beneficial plant or animal life will result from their use.

(2) Some of the listed chemicals are toxic to animal and plant life. They should be applied only with caution by an experienced person. Where individual water-supply systems are proposed, precautions must be taken to prevent infiltrating and endangering the water-supply.

b. Application

(1) Basement or crawl space construction:

(a) Apply to critical areas along foundation walls, around piers and under slabs of porches and entrance platforms.

(b) Apply at a rate of 1 gallon per 2½ lineal feet per foot of depth along both sides of foundation walls, piers, etc.

(c) Under porch floors and entrance plat-

forms, apply over-all treatment at rate of 1 gallon per 10 square feet.

(d) Voids of unit masonry foundation walls and piers, apply to voids at rate of 1 gallon per 5 lineal feet.

(2) Slab-on-ground construction:

(a) Apply an over-all treatment under entire surface of floor slab including porch floors and entrance platforms. Apply at rate of 1 gallon per 10 square feet, except that if fill under slab is gravel or other coarse absorbent material, apply at rate of 1 gallon per 7 square feet.

(b) Apply to critical areas along both sides of foundation wall at rate of 1 gallon per 2½ lineal feet per foot of depth.

(c) Voids of unit masonry foundation walls, apply to voids at rate of 1 gallon per 5 lineal feet.

(3) Treatment shall not be made when the soil or fill is excessively wet or immediately after heavy rains, to avoid surface flow of the toxicant from application site. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbance of the treatment by human or animal contact with the treated soil.

c. Guarantee

(1) Upon completion of the soil treatment and as a condition for its final acceptance, the builder shall furnish to the owner, with a copy to the FHA field office, a written guarantee providing:

(a) That the chemical having at least the required concentration and the rate and method of application complies in every respect with the standards contained herein, and

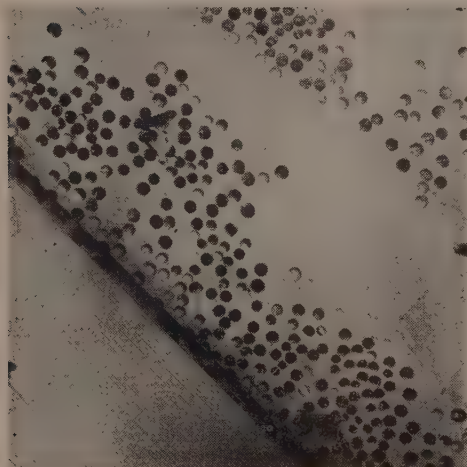
(b) That the builder guarantees the effectiveness of the soil treatment against termite infestation for a period of not less than 5 years from date of treatment. Any evidence of reinfestation within the guarantee period will require retreatment, without cost to the owner, in accordance with the FHA standards.

(2) The guarantee shall be in a form acceptable

Wood Insect or Not? What Would You Have Said?

by J. J. Davis, Professor Emeritus

Department of Entomology, Purdue University, Lafayette, Ind.



This photograph was taken looking up at the sub-flooring in the basement of a new Benton Harbor, Mich. home. The owner insisted to PCO Fred Peden, Excel Chemical & Service, Inc., that the holes appeared after the house was completed. They were about 3/16 inch or less in diameter, and some went completely through the sub-flooring; others were just started. Only one board was affected.

Peden was puzzled, so he had a picture taken, and sent it to us at Purdue, asking what insect could be responsible.

We knew right away it was no insect, since only one board was

affected, there were so many holes, and some were at the edge of the wood. We were convinced the timber must have been used as a drill board by the carpenter who worked on the home.

Peden was advised to consult the builder but couldn't find him; so he sprayed some green dye on the underside of the flooring with a B & G sprayer, using a fan pattern nozzle. This marked the holes then in the wood and helped him determine later that no new holes were being made. This finally convinced the owner his "insect infestation" was just another of the home's built-in features.



Pyrrole Chemical Corp.



For the Coming Termite Season

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to FHA and shall be drawn in favor of the owner, successor or assigns.

815-3.9 Treated Lumber

a. All wood to be treated shall be done by a pressure method (full or empty-cell process) in accordance with Interim F.S. TT-W-571d "Wood Preservative, Treating Practice" or the published standards of the American Wood Preservers' Association and with the following:

- (1) Moisture content of lumber shall be not greater than 30 per cent except that Douglas Fir may be treated green if it does not have a high percentage of sapwood.
- (2) Douglas Fir framing lumber having a least dimension of 2 inches (nominal) or more shall be incised on both wide faces before treatment.
- (3) Preservative used for treating lumber to be painted or which will come into contact with finish materials shall be a paintable type.
- (4) All treated lumber shall be suitably identified as to the name of the treater, preservative used, and the retention in pounds per cubic foot.
- (5) All lumber shall be seasoned after treatment to moisture content required for non-treated lumber.

b. Members to be treated:

- (1) Frame construction — basement or crawl space. Treat all wood up to and including sill plate, joists, header joists, girders, columns, sole plate, subfloor and wood or cellulose type sheathing below first floor line.
- (2) Frame construction—slab-on-ground. Treat all wood, including partitions, up to and including sole plate, studs, top plate, blocking and wood or cellulose type sheathing, but not including siding. In two-story structures, treat as above up to bottom of second floor joists.
- (3) Masonry veneer construction. Treat as (1) and (2) as applicable.
- (4) Masonry or cavity wall construction—basement or crawl space. Treat all wood up to and including joists, girders, columns, and sub-floor below first floor line. Above first floor, treat all wood, except millwork, in contact with or framing into exterior wall, but not including ceiling and roof construction.
- (5) Masonry or cavity wall construction—slab-on-ground. Treat all wood, except millwork in contact with or framing into exterior wall but not including ceiling and roof construction. Treat all wood partitions including studs, plates and blocking, up to ceiling construction in one-story structures and to second floor construction in two-story structures.

c. Framing lumber should be cut to length before treatment. When cutting, notching or drilling is necessary, treat exposed portions with a 95 percent solution of the same preservative used in initial treatment, by a three minute dip or a thorough brush coating. Exposed portions of board lumber and other thin material shall be similarly protected.

d. Plywood to be treated shall be Exterior type complying with MPS 705-6. Plywood shall be pressure treated by full cell process in accordance with the American Wood Preservers' Association tentative standard for the treatment of plywood

recommended by Committee T-9. Treated plywood shall be suitably identified as to the name of the treater, preservative used, and retention in pounds per cubic foot. Brush coat all cut edges with a 95 percent solution of the same preservative used in initial treatment.

815-4 DECAY PROTECTION

815-4.1 Provide protection against damage by decay where required by the FHA field office. Certain members are required to be protected in all areas. The requirement for treatment of other members will be based upon the location of wood members in respect to moisture conditions and upon climatic considerations such as annual precipitation, relative humidity and temperatures during periods of high humidity.

815-4.2 Methods of Protection

- a. Wood members pressure treated in accordance with 815-3.9a.
- b. Doors, windows and other exterior millwork treated in accordance with the National Wood-work Manufacturers Association.
- c. Wood members of one of the following species:
 - (1) California Redwood—"Foundation Grade," for sills and plates, "All Heartwood" for other uses.
 - (2) Tidewater Red Cypress—"100% Heartwood," for sills and plates, "85% Girth Measured," for other uses.
 - (3) Western Red Cedar—"100% Heartwood."
 - (4) Material shall bear the official grade mark and stamp of the association or independent inspection agency grading the species.

815-4.3 Members To Be Protected

Comply with Table 8-7.

TABLE 8-7
Decay Protection

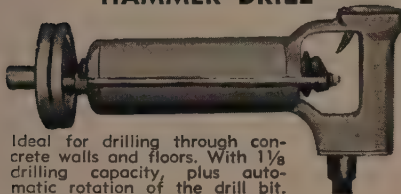
Wood members	Type of protection as identified in 815-4.2
Protection required in all areas:	
Sleepers embedded in or on concrete slabs-on-ground ¹	a or c.
Exterior door frames and window sash and frames ¹	a, b or c.
Access panels, doors and frames to basementless spaces ¹	a, b or c.
Fence posts	a or c.
Protect where required by FHA field office:	
Sills or plates in contact with concrete or masonry within 24 inches of ground	a or c.
Wood columns in basementless spaces	a or c.
Joists, girders, beams, etc., in contact with concrete or masonry within 24 inches of ground	a or c.
Furring strips ¹	a, b or c.
Exterior siding and trim ¹	a, b or c.
Wood gutters ¹	a, b or c.
Other members as required	As applicable

1. Treatment shall be paintable type.

HAMMERS & DRILLS

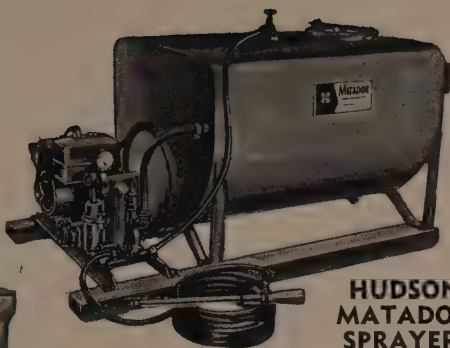
DRILL BITS for wood and masonry
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heavy gauge copper-bearing steel tank, coat-
ed inside and out. Outside finish is pesticide-
resistant enamel. Extra large 100-gal size.

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Available with trailer—\$62.80 extra

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HUB STATES Model 700-S Pump
1/2 h.p. Westinghouse Motor, Viking Pump.
Complete with all hose including 25-ft.
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compression-type with stainless steel
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without trigger action, from ... **\$12.95**
trigger action, from **\$21.30**

HUDSON BAK-PAK 5-gal. Sprayer
in stainless steel finish **\$43.53**

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- ☐ DDT
- ☐ Lindane
- ☐ Malathion
- ☐ Pyrethrins
- ☐ Methoxychlor
- ☐ Grain Fumigants
- ☐ Benzene Hexachloride

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- ☐ Pyrethrins
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- ☐ DDT

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Moth Nuggets

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zene kills moths, moth
eggs, larvae

Pressurized Cylinders

- ☐ Lethalaire
- ☐ Methyl Bromide

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- ☐ Pival
- ☐ Fumarin
- ☐ Red Squill
- ☐ PMP

Liquid Bait

- ☐ Pivalyn
- ☐ PMP
- ☐ Fumarin

Weed Killers

- ☐ Du Pont "Ammate" x
- ☐ 2-4 Dow, formula 40
- ☐ Dow Esteron 99
- ☐ Dow Esteron 245
- ☐ Dow Home Use
- ☐ Geigy Simazine 50-W
- ☐ Amino Triazole

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- ☐ Dow Rapadon (Dalapon)

Brush Killers

- ☐ Dow Babor
- ☐ Dow Esteron
- ☐ Dow Esteron 245

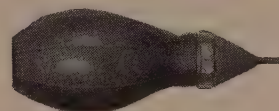
Soil Sterilants

- ☐ Du Pont "Telvar" W
- ☐ Du Pont "Telvar" DW
- ☐ Geigy Simazine 50-W



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Complete with 10" wand, 250-
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In sparkling chrome plate
finish **\$39**
3 & up, less 10%. 5 & up,
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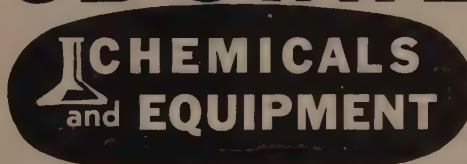


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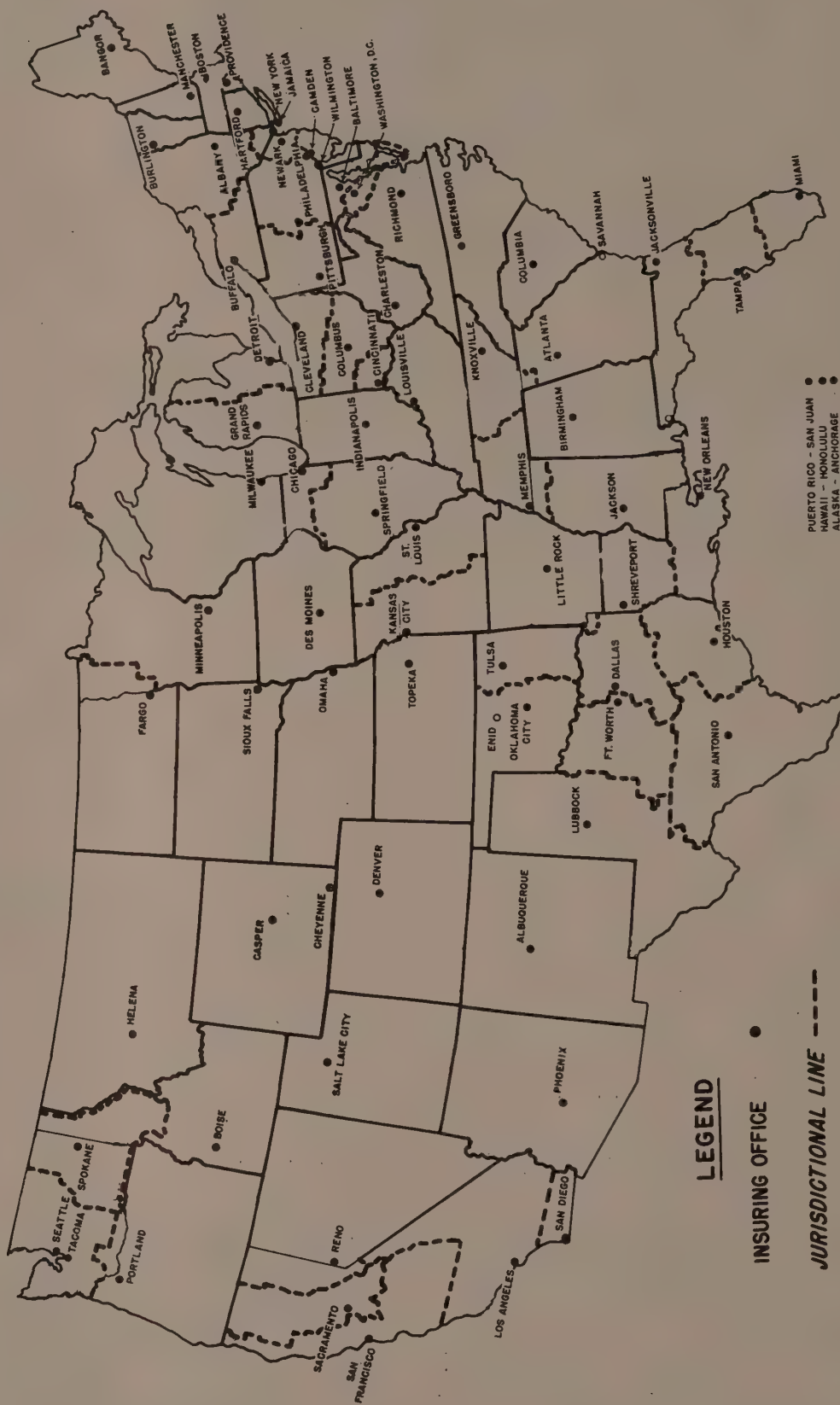
HUB STATES



1255 Windsor St., Indianapolis 1, Ind.

When Writing to Advertisers Please Mention PEST CONTROL

Where to Find Local Insuring Offices of the Federal Housing Administration



SOIL PRETREATMENT for protection against termites can be one of the termite operator's most profitable markets if he knows how to sell it. The Federal Housing Administration has recognized pretreatment under its revised Minimum Property Standards effective next month (see pg. 9). The Navy authorized it for the sprawling 1,100 unit Capehart housing project nearing completion in Beaufort, S.C. (see pg. 19). And now, more and more builders throughout the country will begin to realize the added "sales value" of this service professionally applied by a PCO.

But it will take more than this sales appeal to create a market for pretreatment. You must know whom to sell, how to sell, and where to sell pretreating.

Sell Public, Contractors, Builders

Don Oliver, owner and operator of Shaef Chemical Co. of Savannah, Ga., which pretreated the Capehart project, concentrates his selling effort upon the public, contractors, and builders.

"We keep a running barrage of direct mail to these three groups, trying to create a demand for our pretreatment service," Mr. Oliver advises. "At first, we butted our head against a solid wall of resistance from every architect in Savannah, and practically every building contractor, large or small. But now many have come around to the idea — mainly because their homes became infested and they had to answer to their buyers for it."

And don't forget real estate developers, bankers, home loan associations, and civic improvement groups. They'll be interested in this service, too.

How do you get to meet these influential people? Through local trade associations, your chamber of commerce, and other civic organizations. Mr. Oliver says one of his competitor's top-notch salesman goes a step further, shows color slides to every club and organization that will let him be on its program. These slides demonstrate the need for protection by illustrating how termites penetrate small cracks in a slab foundation to enter a home.

Cooperate with Builder

Once you meet the builder or contractor directly, stress soil pretreatment as an added selling point for him. It adds little to

HOW TO SELL SOIL PRETREATMENT TO BUILDERS

the cost of a building but increases its value substantially. Help him sell the buyer on this advantage. Construction can be protected more thoroughly through pretreatment than with later, peripheral treatment around the slab after termites have penetrated the home and caused costly damage to the structure. Because the entire soil area under the home is exposed for treatment during construction, application is thorough. These advantages mean less worry for the home owner, better control, and a long-range saving.

The success of pretreatment requires good construction practices, as well as chemical treatment of the site. You can help the builder by explaining what these practices are and why they are necessary. You can also aid him by going over building plans carefully, and showing him how your pretreatment will fit in with his building schedule.

There are many reasons why it's to the contractor's practical and economic advantage to hire an experienced termite operator for pretreatment rather than trying to poison soil himself. The termite operator has the specialized equipment and technical skills which this work demands; he knows how to buy his chemicals and apply them more efficiently, hence more economically than a contractor could. The termite operator is better equipped to give the five-year guarantee required on FHA-financed construction, a provision which the contractor probably cannot meet. The insurance or bonding carried by pest control firms is another added advantage to sell. And in states where ter-

mite control is licensed, let the contractor know of this legal requirement. He'll soon realize soil pretreating is too specialized to undertake himself.

Read Your Newspaper

Then there's the newspaper. Watch for news of contracts that are placed or projects proposed. If you find nothing in the general, classified, or news-of-record sections of your newspaper, check your city or county building records department to see who has taken out building permits for residential or commercial construction. Most pretreatment jobs are sold long before actual construction starts. If you can make a pretreatment bid in the early planning stage of a construction job, your chances of getting a contract are that much better.

For an indirect contact with builders, become acquainted with your local insuring office of the Federal Housing Administration or the office nearest you. They are located in key cities all over the country. (See map, opposite page). Talk to the architect in charge; let him know who you are in case a builder of an FHA-financed home or development asks him for names of termite operators who offer a pretreatment service.

Advertise Your Service

If your advertising budget is sufficient, experiment with newspaper, radio, or television promotion. Your chemical supplier or local radio or television station may help you work out spot announcements. Other advertising ideas: signs on building sites you are pretreating; simple handout pieces where model homes are on display, and exhibits at home shows.

Whenever you treat an older home for termites, let the owners know the infestation could have been prevented with soil pretreatment. They'll remember this, and possibly tell others.

"After you get a pretreatment contract," Mr. Oliver says, "make friends with the plumber, the brick mason, the heating man, and keep selling pretreatment. Teach your men, even laborers, the fundamentals of the job you're doing, so they can answer questions intelligently, thus selling everyone, all the time on the value of PCO-applied pretreatment to protect against subterranean termite attack."

*For
dry-wood
termites*

plan on
PESTMASTER*

QUICK DELIVERY. Inventory of material at strategic public warehouse points permits overnight delivery of Michigan Chemical Pestmaster Methyl Bromide. You can be on the job fast when you plan on Pestmaster.

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How Savannah TO Oliver

Pretreats 1,100 Unit Navy Project

To Protect Against Termite Infestation

IN BEAUFORT, S.C., you can work up a sweat just sitting on the verandah during the summer months. The climate is hot and humid. Average annual temperature is 63.1°, and average annual rainfall, 42.45 inches. This is ideal weather for swimming, dozing in the shade, ice cold Coca Cola, tall cool Collins — and termites. High temperatures and heavy rainfall make this section of the country a termite haven.

It's also an excellent place for people to live, and the population growth has created a need for a great deal of additional housing in recent years. Leading the building boom is the 1,100 unit government-sponsored Capehart housing project, the largest single unit housing project in the world. This project, begun January 23, 1958, is scheduled for completion on May 1 of this year. It is turning what was a tract of forest land a little over a year ago into a full-size community, at an estimated cost of \$15 to \$20 million.

Shaef Bids, Gets Contract

The planners of the project were concerned about termite control from the start. Weather conditions, the fact that the project was to be located on a forest site known to be infested, plus the amount of termite damage suffered by other homes in the area indicated a positive control program had to be adopted. Following the U. S. Department of Agriculture Forest

Service recommendations, the planners wrote pre-construction termite control into their specifications, and asked for bids from a number of pest control operators. Low bidder on the job was Shaef Chemical Company, Savannah, Ga., which is owned and operated by Don Oliver.

For Mr. Oliver, this was the high point in his business development program that has been going on for many years.

"Shaef Chemical Company was established 14 years ago," Mr. Oliver says. "During the post-war building boom, we saw the need for more adequate termite protection in homes built on concrete slabs, and helped pioneer pretreatment of soil under slabs, using a chlordane emulsion. We have pretreated many homes for

builders and individuals in this area, and have kept statistical records on all of them. The houses pretreated with chlordane have remained 100% free of infestation by subterranean termites.

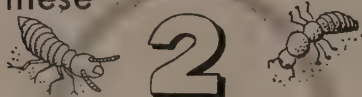
"When we discovered the Federal Government was planning to build the largest segment of Capehart Housing (1,100 single units) in Beaufort, S.C. for the Navy and that soil treatment under slabs was required, we bid and got the contract."

For the work, Mr. Oliver agreed to payment "in place" or payment according to progress on the job. Every month on or about the 30th, he is paid for work completed to the 17th of that month. The over-all treatment is scheduled to take 18



Chemical application to footing trench is first step in pretreating Capehart project. Wooden cases containing jugs of 72% chlordane are stacked just behind the cab on the pick-up trucks. Concentrate is mixed with water carried in 55-gal. drums which are refilled as needs of the job demand, enabling a smaller truck to be used. This helps reduce costly work stoppage.

Designed SPECIFICALLY
for **PEST CONTROL WORK**
these



NEW Carbide Tipped MASONRY BITS

will give you **MORE**
PROFIT on every
job!

Exclusive NEW design

- Eliminates bulking and costly work stoppages.
- Increases number of holes drilled between sharpenings.
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SLO-SPIRAL Carbide-Tipped ROTARY MASONRY BIT

For drilling
without binding
in **GREEN**
CONCRETE,
MARBLE or
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HIGH-BULKING
MATERIALS

- Long, high capacity spiral grooves efficiently remove bulking material from cutting zone.
- Carbide tip is copper brazed for longer Bit life.
- 6" lengths — Diameters from $\frac{1}{4}$ " to $\frac{1}{2}$ ".
- Also available in $\frac{3}{16}$ " diam. and 3" lengths.

SUPREME Carbide-Tipped SPIRAL HAMMER BIT

For Hammer
drilling without
binding in
HARD OR SOFT
MASONRY

- For use in ANY Electric or Pneumatic Hammer.
- Long high capacity spiral grooves efficiently remove bulky powder from the cutting zone.
- 12" lengths — diameters $\frac{1}{2}$ " to 1".
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Gentlemen: —
Kindly send me a copy of the "WHAT and HOW" Manual.

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Pad treatment at Capehart comes after the footing has been poured and the exterior walls started. Oliver thus drenches all exposed soil that will be under the slab. To help guarantee the effectiveness of his soil poisoning, Don Oliver's pretreatment customers agree in writing not to make any structural changes in the building without notifying him. The customer also agrees not to place any cellulose material near the outside of the home. Mr. Oliver pretreated his first house for termites in 1946, has steadily been increasing his volume year by year.

months, but he hopes to finish it by the end of this month or early in March.

Must Be A Clock-Watcher

The completion date, however, depends almost entirely on the work schedule of other contractors. That's the toughest problem Shaeff Chemical faces on the project.

"For a job this size," Mr. Oliver says, "we use an average of eight trained operators a day, plus temporary assistants when the work schedule requires it. And on some days our crews get in only three or four hours work because they have to wait around for construction men ahead of them to wind up their jobs. This can be expensive, considering we have to travel 50 miles to get to the project."

Yet Mr. Oliver has made up for this high labor overhead with some time-saving shortcuts. To assure a steady flow of chemical, 72% chlordane in 55-gallon drums has been stockpiled in the construction area. Cases of 1-gallon jugs are filled from these drums, then loaded onto Volkswagen pick-up trucks, along with four 55-gallon drums filled with water. This way, finished solutions can be mixed at the site to avoid running out of chemical before a treatment is completed.

The trucks, equipped with chemically-resistant hose and a centrifugal pump powered by a Briggs and Stratton gasoline motor, then travel from site to site as they are needed.

"Because these vehicles do not carry the maximum load we need, we borrowed a 1½-ton flat-bodied fuel oil truck and a 1,000-gallon tank from our gasoline and kerosene supplier last summer," Mr. Oliver indicates. "This had to be returned, of course, when the cold weather came on."

Since no water was readily available, Mr. Oliver hauls all the water he needs on the project over very rough terrain, and for two months had to pump it from ponds and ditches which were about a mile away.

To make a 2% solution ordered for this job, the insecticide is mixed with water at the rate of 1 gallon of 72% chlordane to 48 gallons of water. About 650 gallons of this diluted material is applied to each unit, which is between 1,300 to 1,500 square feet. About 2,000 feet of hose is being used on the project with sprinkler-type garden nozzles.

"We've had no breakdowns with this nozzle," Mr. Oliver notes. "And since it's so easy to control the pressure merely by opening or closing the nozzle, we

Our Specialty-Equipment for Termite Control Operators



T & P Unit #56

A leader for Termite Control. Capacity, 4 GPM Pressure up to 150# with Agitating Hose.



Unit #6500

For Weed and Tree Spraying and Termite Control, 1 or 2 outlets, Capacity 6 GPM. Pressure up to 250# with agitator.

WE MANUFACTURE SIX DIFFERENT UNITS— All Are Tried and Proven and Engineered To Meet Your Requirements. State Purpose and Chemicals Used. Will Advise Fully

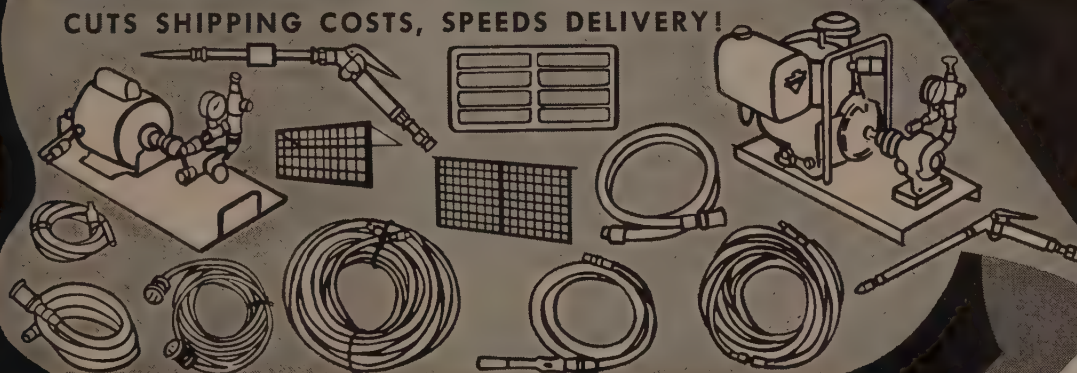
Check These Items
Every Termite Operator
Needs.

- ☐ Termite Hose
- ☐ Suction Hose
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- ☐ Strainers
- ☐ Flow Guns
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- ☐ Fine Stream Sprayers
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AS&S

can sometimes make a one-man operation out of the application."

The timing of chemical application is tailored to the construction schedule of building crews. Treatment conforms to U. S. Department of Agriculture recommendations, which specify how much chemical to use and where to put it. To be certain chemical requirements are met, a Government official periodically checks samples of chemical as it comes out of the nozzle.

Treatment begins as soon as

footing trenches are excavated. Before concrete is poured, the 2% chlordane solution is applied at a rate of 1 gallon per 4 lineal feet. Both the walls and the base of the trench are treated. Use of low-pressure equipment assures that dirt will not be washed into the excavation.

The operator does not return to the site until the footing has been poured, and the building crew has made all preparations for pouring the slab. This includes placement of utility pipes

and ducts. At that time, all the exposed soil (or pad) that will be under the slab is drenched with a 2% chlordane solution, at the rate of 1 gallon per 4 square feet of surface. Critical areas, such as expansion joints and utility entrances through the slab, are treated at the rate of 2 gallons per 5 lineal feet. After this treatment, slab areas are immediately covered with a polyethylene vapor barrier. Steel reinforcement is positioned, and the concrete slab is poured.

"While the pad is being treated, our men also apply chemical inside the exterior walls, from the grade to the footing," Mr. Oliver says. "This is important, because voids in the mortar and holes in the brick can be a super-highway for termites. The dosage used for this treatment is 1 gallon of 2% chlordane solution per 4 lineal feet."

As a result of these methods, housing units at Capehart are protected against termite damage for a fraction of the building cost. The company responsible for building the project, Albert Gersten & Associates, Beverly Hills, Calif., is thoroughly sold on the value of pretreatment. Project superintendent, William Holden, says, "My experience with pretreatment on the Capehart development has convinced me that it should be a part of every construction project. I'll certainly include it in any future construction I do in termite-infested areas."

Find Colonies on Tract

Mr. Oliver reports the foresight of project planners, to include termite control, was confirmed as soon as construction began. Many termite colonies were found on the site, living in water oaks. One colony was found only 7 feet from the site of a home. Because the entire area had been in forest before the project was started, it would have been extremely difficult to clear the soil of all roots and other wood debris. In many cases, pieces of tree roots were found extending into footing trenches after they were excavated, despite the builder's conscientious efforts to remove all possible "termite food" from the soil.

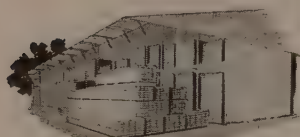
In addition, Mr. Oliver points out, slab type construction and masonry walls such as used in the Capehart project are as vulnerable to termite attack as

CONTROL DEADLY GAS

WITH LABORATORY TESTED **Hoosier** FUMIGATION TARPULS



BUILDINGS



LUMBER

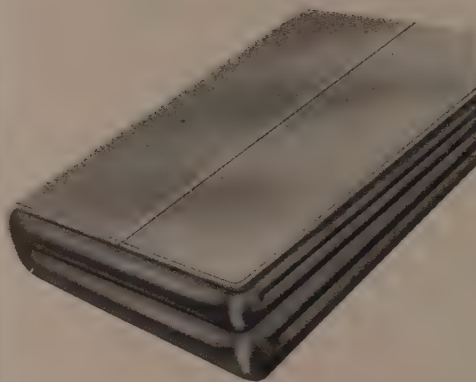


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Immediate Delivery in ANY size.
Red or Green; 4 basic weights.

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Soil poisoning, of course, is only one segment of pretreatment termite control. As a part of his service, Mr. Oliver advised the builders of the Capehart project of the Forest Service's recommended structural measures that aid in termite control. These are given in "Recommendations for Protecting Wood in New Construction from Attack by Subterranean Termites," published by the USDA Forest Service, Division of Forest Insect Research, Forest Insect Laboratory, Beltsville, Md. They include eliminating all wood from the ground (grade stakes, spreader sticks, stumps, etc.), adequate drainage, and, for crawl space construction, adequate clearance and cross ventilation.

Six Pointers for Bidding

From his experience gained on the Beaufort project, his first large pretreatment job, Mr. Oliver says there are six important things for termite operators to keep in mind when bidding on big contracts:

1. **Performance bond** — find out exactly what your insurance representatives will require to underwrite your work.
2. **Equipment** — Have at least one fuel oil truck with tank, meter, and a good pump.
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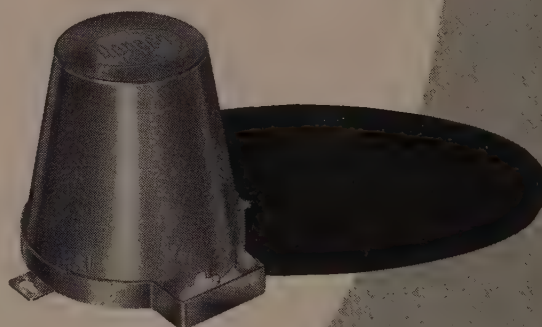


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Venomous Animals, Spiders, and Insects

by
SHERMAN MINTON, M.D.

Visiting Professor of Microbiology
Basic Medical Science Institute
Karachi, Pakistan

PART TWO: Insects

THE PICTURE of a fat man pursued by a swarm of angry bees or hornets is a stock comic strip situation, but in reality it may be anything but funny. T. K. Marshall, an authority on toxicology and forensic medicine, estimates 400 to 500 honey bee stings may be fatal to an adult, and the writer would guess 15 or 20 stings by the whitefaced hornet would be fully as dangerous as the bite of an average-sized copperhead.

Chief Stingers

Nearly all serious injuries by insects are due to stings of the social Hymenoptera—bees, wasps, and ants. In the United States, leading offenders are the honey bee (*Apis*), bumble bees (*Bombidae*), paper wasps (*Polistes*),

and yellow jackets and hornets (*Vespa*).

The introduced fire ant (*Solenopsis saevissima*) appears to be an increasing problem in the Mid-South. This species grasps the skin with its mouthparts and may rotate its body, inflicting several stings.

Although some of the solitary species such as the large hunting wasps (*Sphecidae*) and velvet ants (*Mutillidae*) can sting painfully, there is no chance for dangerous multiple stings. Some of the big Hemiptera such as wheel bugs and giant waterbugs can inflict painful and mildly venomous wounds with their beaks.

Many kinds of caterpillars have poisonous, nettling spines, and, contact with one of the big tropical American species (*Megalopyge*) is followed by intense pain and some signs of generalized poisoning.

Human Reaction to Venoms

Toxins injected by insects all seem to be protein or protein-like venoms, and some contain histamine. It has long been thought formic acid was an important component of insect venoms, but this has not been confirmed by recent work.

Nearly all entomologists know of instances where serious or fatal reactions have followed single stings by commonplace insects such as honey bees. In these cases there is nearly always a history of a previous sting or stings. This has left the individual in a hypersensitive state, so one sting can trigger the disastrous reaction known as ana-



Fire ants feeding on unopened flower bud of okra (*Hibiscus esculentus*) in Mobile County, Alabama. Photo, courtesy of the U. S. Department of Agriculture. Next month, Dr. Minton will cover venomous centipedes.

phylactic shock. Why one beekeeper becomes so highly sensitive to his insects that he must abandon his occupation while another becomes immune to stings is an unsolved riddle. Sensitivity is said to develop in about 2% of the persons who have had repeated insect stings and seems to develop more readily in those who are prone to hives, asthma, and other allergic conditions. Sensitivity is fairly specific. Persons exquisitely sensitive to honey bee stings have been stung by wasps without serious effect and the reverse also holds true.

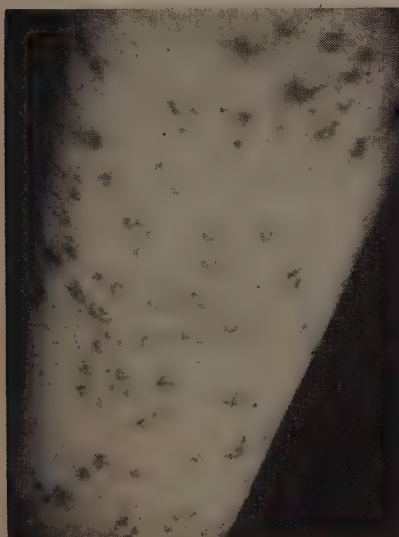
Control

All common stinging insects appear highly susceptible to chlorinated hydrocarbon insecticides, and control of wasps, bees, and hornets around dwellings is usually not difficult. Since many of these insects are highly beneficial, large scale control programs are not advisable. The Department of Agriculture's control program directed against the fire ant is open to serious criticism on the ground that intensive use of dieldrin over large areas will seriously disturb the entire fauna, possibly with the result that the fire ant's predators, parasites, and competitors will be hit harder than the ant itself.

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Leg of fire ant victim is covered with pustules 72 hours after stings. These persist for three to eight days. Photo, courtesy of Dr. V. J. Derbes, Tulane University, New Orleans.



STRAINS of the German cockroach showing resistance to chlordane have now been reported from many areas of the United States (DuChanois, 1956; Keller et al., 1956a; Brown, 1958, pg. 201). In addition, it has been shown that a number of these chlordane-resistant strains were from three to six times as resistant to pyrethrins, and one strain was 31 times as resistant, as normal cockroaches (Keller, et al., 1956b). The writers have been unable to find any published reports of resistance to organophosphorus insecticides in the German cockroach. Reports from field experiences indicate that a few populations are suspected of being resistant, but the writers are not aware of any of these having been confirmed through tests in the laboratory.

The results of tests for the residual effectiveness of a number of insecticides in control of resistant and non-resistant German cockroaches have been reported (Jarvis and Grayson, 1957; and Grayson and Jarvis, 1958). Tempered "Masonite" panels were used in most of the tests, but certain insecticides were further tested on panels of different materials commonly found inside buildings. Good to excellent control was obtained on "Masonite"

Latest on

Resistant Roach Control Research at VPI¹

by **DR. J. M. GRAYSON**
and **D. H. MESSERSMITH²**

Virginia Agricultural Experiment Station
Virginia Polytechnic Institute
Blacksburg, Virginia

panels with Dicapthon, Diazinon, Korlan, Malathion, and Malrin; however, Diazinon gave poor control on such surfaces as glass, galvanized sheet metal, and linoleum.

The purposes of the experiment reported here were to further test promising insecticide formulations, and to investigate new materials, in control of both resistant and non-resistant German cockroaches. The cockroach strains used were the normal and chlordane-resistant ones maintained in the entomological laboratories of the Virginia Agricultural Experiment Station.

Materials and Procedure

Ten formulations involving four different materials were included in the experiment. All of these

were tested on tempered "Masonite" panels. The materials were as follows: technical chlordane (Velsicol Chemical Corp.); Dicapthon 25% emulsifiable liquid (American Cyanamid Co.); Thiodan 25.7% miscible (Niagara Chemical Division, Food Machinery and Chemical Corp.); and Sevin as both a 50% wettable powder and as a 13% emulsion (Union Carbide Chemicals Co.). A refined kerosene was used in preparing the oil base formulations.

The cockroaches were reared and maintained at approximately 30° C. and 65% relative humidity. Otherwise, the procedure employed for rearing and obtaining adults within known age limits was the same as that previously described (Jarvis and Grayson,

Percentage mortalities at the end of one and three days* following exposure of female German cockroaches to panels which had been dipped in different insecticide formulations and the deposits allowed to age for various periods of time.

Insecticide and Formulation	Cockroach Strain	Age of Insecticide Deposit (Days)				
		2	7	15	30	60
Thiodan, 0.5% (Emulsion)	Resistant	2 - 5	0 - 1	3 - 3	1 - 5	0 - 3
	Non-res.	32 - 85	27 - 64	16 - 55	11 - 64	9 - 30
Thiodan, 1.0% (Emulsion)	Resistant	0 - 2	1 - 5	2 - 11	0 - 4	4 - 9
	Non-res.	64 - 85	47 - 81	55 - 84	39 - 85	33 - 73
Sevin, 2.5% (Water suspension)	Resistant	98 - 100	96 - 98	89 - 98	92 - 100	---
	Non-res.	98 - 98	95 - 99	96 - 97	79 - 91	---
Sevin, 5.0% (Water suspension)	Resistant	100 - 100	99 - 100	95 - 96	93 - 96	96 - 98
	Non-res.	100 - 100	99 - 99	96 - 96	100 - 100	91 - 95
Sevin, 5.0% (Emulsion)	Resistant	2 - 2	0 - 1	5 - 9	7 - 9	5 - 6
	Non-res.	3 - 3	8 - 11	4 - 7	7 - 11	9 - 18
Dicapthon, 0.25% (Emulsion)	Resistant	100 - 100	100 - 100	89 - 100	19 - 97	7 - 56
	Non-res.	100 - 100	99 - 100	95 - 100	21 - 73	4 - 58
Dicapthon, 0.5% (Emulsion)	Resistant	100 - 100	100 - 100	99 - 100	97 - 100	56 - 98
	Non-res.	100 - 100	100 - 100	100 - 100	83 - 97	62 - 94
Dicapthon, 1.0% (Emulsion)	Resistant	100 - 100	100 - 100	100 - 100	100 - 100	99 - 100
	Non-res.	100 - 100	100 - 100	100 - 100	96 - 100	97 - 100
Dicapthon, 1.0% (Oil base)	Resistant	100 - 100	100 - 100	99 - 100	95 - 100	77 - 100
	Non-res.	100 - 100	100 - 100	97 - 100	86 - 100	81 - 100
Chlordane, 2.0% (Oil base)	Resistant	2 - 8	0 - 1	3 - 8	3 - 7	1 - 2
	Non-res.	64 - 93	55 - 79	37 - 70	36 - 70	26 - 55

* Under each column the first figure is the percentage mortality at the end of a one-day exposure period, and the second figure is the same for a three-day exposure period.

1957). The panels were treated by dipping them for several seconds in the desired insecticide formulation, placing them on one edge in an almost vertical position for drying, and then suspending them from the joists of a service building until they had aged for the desired length of time. All surfaces of the panels were exposed to air movements by suspending them in vertical racks with spaces between panels.

The testing procedure consisted of placing female German cockroaches in battery jars, each of which contained three treated panels. All of the tests were replicated four times, using from 15 to 20 cockroaches for each replicate, except those for the two-day aging period which were replicated only three times. The cockroaches were continuously exposed to the treated panels for a three-day period. Mortality readings were taken at the end of one and three days following exposure of the cockroaches to the treated panels.

Results

The results are shown in the accompanying table. Dicapthon as a 1.0% emulsion gave excellent kill of both resistant and non-resistant cockroaches after only one day of exposure to panels on which the deposits had aged for various periods up to 60 days. Similarly, deposits from a 0.5% emulsion of Dicapthon gave excellent kill of non-resistant and resistant cockroaches after 15 and 30 days of aging, and from a 0.25% emulsion after seven days of aging. A 1.0% oil base formulation of Dicapthon was slower in effectiveness than an emulsion at the same concentration, but it gave complete mortality after three days of exposure to treated panels. Sevin, as a water suspension, showed considerable promise as it gave good to excellent control of both resistant and non-resistant cockroaches after the deposits had aged for 60 days when applied at a concentration of 5.0%, and after 15 to 30 days of aging when applied at a 2.5% concentration. On the other hand, deposits from a 5.0% emulsion of Sevin gave very poor control at all aging intervals. Emulsions of Thiodan at 0.5 and 1.0% gave unsatisfactory kill of cockroaches, although moderate toxicity to non-resistant females was indicated. Unsatisfactory control was obtained from a 2.0% oil base for-

mulation of chlordane at the end of a three-day exposure period.

Summary

The residual effectiveness of 10 insecticidal formulations applied to tempered "Masonite" panels in killing female German cockroaches from resistant and non-resistant strains was determined. The panels were dipped in the insecticidal formulations and the deposits allowed to age for periods of 2, 7, 15, 30, and 60 days before placing the cockroaches on them. Mortality counts were made at the end of one- and three-day periods of exposure to the treated panels.

Dicapthon gave very high kill after the deposits had aged for 60 days when applied as a 1.0% emulsion, after 30 days of aging as a 0.5% emulsion, and after 15 days of aging when applied as a 0.25% emulsion. A 1.0% oil base formulation of Dicapthon was slower in effectiveness than an emulsion at the same concentration. Sevin showed considerable promise in cockroach control as good kill was obtained after the deposits from a 5.0% water suspension had aged for 60 days, and after those from a 2.5% water suspension had aged for 15 to 30 days. However, a 5.0% emulsion of Sevin gave very poor control at all aging intervals. Emulsions of Thiodan at 0.5 and 1.0% gave unsatisfactory kill of cockroaches, although moderate toxicity to non-resistant cockroaches was indicated. Unsatisfactory control was obtained from a 2.0% oil base formulation of chlordane at the end of a three-day exposure period.

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2. Graduate student. Mr. Messersmith is now a staff member in the Department of Biology, V.P.I. Woman's Division, Radford College, Radford, Virginia.



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soil conditions and termite control

Part One: characteristics of soils



J. V. Parcher, an associate professor of civil engineering at Oklahoma State University, Stillwater, received his M.S. degree in Civil Engineering in 1948, spent 1954-57 at Harvard working toward his Ph.D. Both the graduate courses he has taught and his research are in the field of soil mechanics.



R. E. Means is a professor of architecture at Oklahoma State University. Listed in "Who's Who in Engineering" and "American Men of Science," Professor Means frequently serves as a consultant on soil mechanics. He received his M.S. degree from the University of Illinois in 1932.

by **J. V. PARCHER** and **R. E. MEANS**

The writers of these articles do not profess to be experts on control of termites or other pests nor, indeed, to possess any knowledge of biological characteristics of these insects beyond that of the ordinary, interested layman. Yet, the fact that the natural habitat of the termite is soil places this pest in a medium with which the writers are familiar.

It will be our purpose here to examine particularly properties of soils related to the problem of subterranean termite control. Before attempting this, however, it will be well to establish a familiarity with some of those terms commonly used in describing soils.

Shear Strength

Every material capable of sustaining load possesses shear strength. It is characteristic of materials that when a short specimen is overloaded in compression, failure will generally result in one of two ways: (1) the specimen may yield and flatten out due to its inability to carry the stress acting on a cross-section perpendicular to the direction of the load, or (2) failure may occur along a diagonal plane by a slipping of one part of the specimen relative to the other without either part having necessarily

undergone any noticeable distortion. A failure of this latter type is called a shear failure and is typical of the manner in which soil specimens fail. Failure is due to that component of the force which acts along the diagonal plane, and the shear strength of the soil is the magnitude of the greatest stress which can be resisted along this plane without resulting failure. This strength may be derived from frictional resistance between soil grains along the plane, which depends upon the force with which the grains are pressed together, or it may be an inherent resistance to relative displacement—a resistance which, unlike frictional resistance, does not depend upon the existence of any external force.

Cohesionless Soils

Soils are very broadly classified as cohesionless or cohesive soils. A truly cohesionless soil possesses no inherent shear strength and, when dry, can be poured like water. However, when these soils are acted on by outside force, as when confined at some depth, they may possess very high shear strength due to the mobilization of frictional resistance. Examples of cohesionless soils are clean gravels, sands, and silts. Such soils are largely composed of mineral fragments hav-

ing approximately equal dimensions in all directions.

Cohesive Soils

Cohesive soils, of which clay is typical, possess an inherent shear strength. Although physical properties of clays vary widely from one locality to another, the property of cohesion is common to all. This cohesion is dependent upon the amount of water present in pores between soil grains, and upon the physical and physico-chemical properties of the grains.

Minerals which impart to clay its physical properties customarily occur in nature as extremely small, flat, scale-like particles. They often resemble tiny flakes of mica, but are so small that a large percentage of them are not visible, even under a high-powered microscope. These minerals differ from those found in cohesionless soils in other ways, also. In particular, they have a high affinity for water. That is, they attract, and hold to their surfaces, molecules of water. A thin layer of water adjacent to the grain is al-

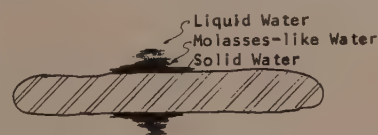


Fig. 1. A clay grain, and the different stages of water viscosity near its surface.

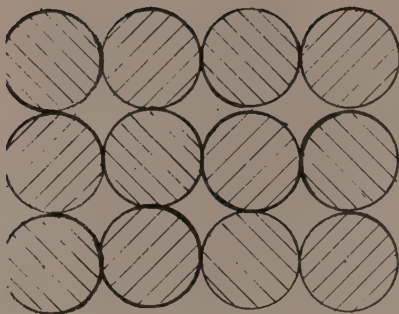


Fig. 2. Loose sand has a high void ratio due to its loose state of compaction, hence there are large air or water spaces between each of the grains that make loose deposits of this nature a potentially unstable medium.

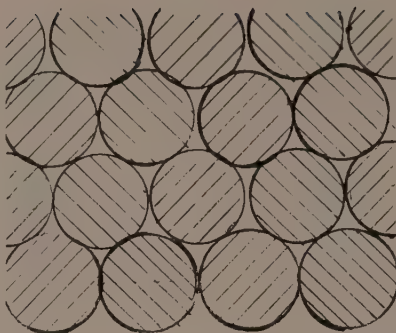


Fig. 3. Dense sand with its low void ratio is often found in the form of natural deposits made up of medium and coarse grains.

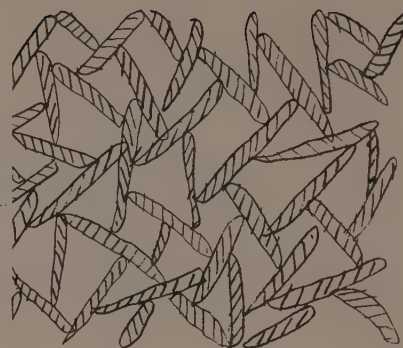


Fig. 4. Clay particles, in an idealized loose soil deposit. Note how the void ratios vary.

most completely immobilized (or solid). With increasing distance from the mineral grain, viscosity of the water decreases, possessing, in turn, properties much resembling those of asphalt, molasses, and, finally, ordinary water. It is the presence of this viscous water, called the adsorbed water, which gives clay its inherent strength. (See Figure 1, page 29).

Plasticity

Clay may exist in any state between that of a liquid and that of a solid, depending upon relative quantities of free water and adsorbed water present in the sys-

tem. When the water content is such that water present in the soil is principally adsorbed water, grains can be slipped past each other by applying enough pressure to overcome the viscous resistance of the molasses-like water. In this state the clay can be molded easily and rapidly to any shape without rupture or change of volume. This property is called plasticity and is found only in cohesive soils.

Factors Affecting Strength

With the exception of clean gravels, sands, and silts, most natural soils depend upon both

cohesion and frictional resistance for their shear strength. Even very plastic (fat) clays derive a significant part of their shearing resistance from internal friction.

Shear strength of cohesionless soils, while depending primarily upon the confining pressure, is decisively influenced also by shape of grains (rounded or angular) and, especially, by degree of compactness (relative density) of the soil structure. These latter two properties have a marked effect on the size of void spaces between grains and upon the amount of intergranular interlocking which exists. A considerable portion of what has been called frictional resistance is due to the interlocking effect.

Void Ratio

Let us now introduce a new term, void ratio, and define it as being the ratio of volume of the void spaces (actually containing either air or water) to volume of solid mineral grains present in any given volume of material. Cohesionless soils may exist in a loose state of compaction (high void ratio), in a dense state (low void ratio), or in any condition between these two extremes. (See Figures 2 and 3).

Loads on Sand

Near the surface of the ground, loose deposits of sand are potentially unstable. When vibrated with sufficient force the grains roll to more stable positions with a consequent increase of density and reduction of void ratio in the soil. This is accompanied by a subsidence of the surface. Natural deposits of medium and coarse sands, and gravels are almost always in a medium or dense state and are stable, whereas fine sands and silts often occur naturally in a condition loose enough to be potentially unstable. It should be pointed out, however, that the

Adventures of Mort

by Gerald Curtis, Vogel-Ritt, Inc., Detroit, Michigan

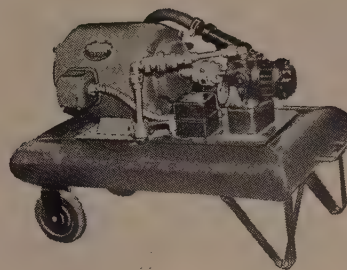


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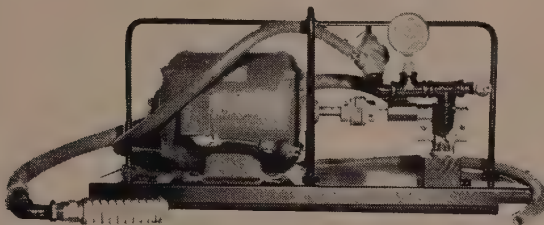
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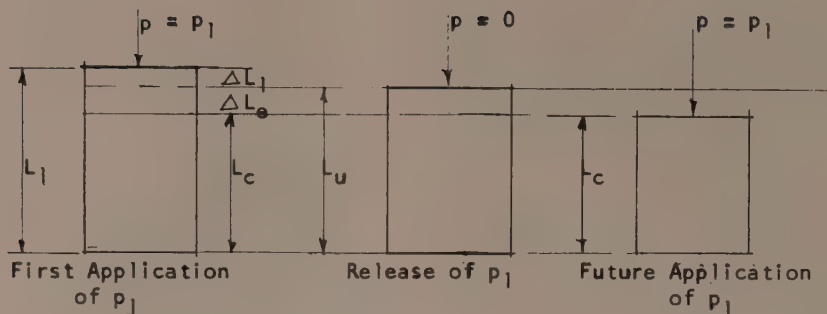


Fig. 5. Deformation of clay under repeated loading. In the diagram above, p represents a general symbol for load per unit area; p_j , a specific value of p ; ΔL_i , the inelastic part of the total deformation; ΔL_e , the elastic part of the total deformation; L_u , the unloaded thickness of the soil; and L_c , the thickness of the soil when it is in equilibrium under the load p_j .

subsidence or settlement of either a loose or a dense deposit under moderate static (dead) load is generally inconsequential.

Loads on Clay

The behavior of clays under loading is quite different from that of cohesionless soils and must be considered now in some detail.

Regardless of the deposit's manner of origin, the individual mineral grains will be oriented in a random manner (see Figure 4).

The void ratio will vary from values often less than unity for residual clays and many fresh water deposits, to values occasionally as high as eight or nine for marine deposits.

Void ratio less than unity means that, in such soils, more than half of the total volume is occupied by solid material, i.e., the soil grains. Marine clays usually have a flocculent structure (the clay particles come together in clusters before settling from suspension). When this occurs, the volume of the voids may be 8 or 9 times as great as the volume of the solid mineral grains. These clays will undergo far greater volume change, when loaded, than will clays having a lower void ratio.

The behavior, under load, of saturated clays (voids completely filled with water) is fundamentally different from that of non-saturated or dry clays. For a saturated clay, deformation under load is composed of two parts. One part consists of an elastic deformation of mineral grains, which act as tiny springs, and the other part is due to a displacement or sliding of grains past each other. In either case, the volume of the clay must decrease, which means some of the water must be squeezed out of the voids. Since pore openings in clay are

extremely small, this compression process, called consolidation, takes place very slowly over a long period of time.

Natural clay formations, after having been consolidated for thousands of years under pressure of overlying deposits, develop a more intimate contact between grains due to a very slow displacement of a portion of the more viscous water which normally separates the grains. This results in an increase of strength of the clay because of a rise in cohesive resistance. Remolding of clay will destroy these bonds and reduce the shear strength to only a fraction of that of undisturbed soil. Clays which have been consolidated at one time under loads greater than the present overburden are called "over-consolidated" clays. They are stiffer and less sensitive to remolding than normally consolidated clays.

If a consolidated clay is unloaded, it will swell when free water is available, but only the elastic part of the original deformation is recoverable. If the original load is applied again, the structure will now deform elastically, as under the first loading, but there will be practically no additional displacement of the grains (inelastic deformation). This deformation under repeated loading is illustrated in Figure 5.

Shrinking and Swelling

Suppose now that a reduction of water content is accomplished, not by squeezing out water under applied load, but by evaporation—i.e. drying out of the clay. As evaporation takes place from the surface, water in the pores, which are very fine capillary tubes, will begin to retreat inward. Attraction of surface molecules of water for each other and for soil along the tubes sets up a resistance to

this movement with the result that the surface of the water curves inward in each pore and the pore water itself is placed in tension. The magnitude of this capillary tension in the pore water depends principally upon the size of pores. Figure 6 illustrates how the tensile force, u , in the water must increase as the surface retreats within the soil. As a result of this tension in the pore water, the soil structure itself is placed under compression and undergoes a reduction in volume in the same manner as described for the consolidation process. If water is again added to the soil, destroying the capillary tensions, the soil structure will expand elastically, just as before.

In very general terms, permeability is related to those properties which govern flow of fluid through a porous material. Specifically, in soils, the quantity of flow per unit of area and time depends on a soil constant, the distance through which flow takes place, and the head (or pressure) which causes the flow. The soil constant is called the "coefficient of permeability" and depends upon volume and size of the void spaces, structure of the soil, and viscosity of the fluid (varies with temperature).

In the March issue, we will make use of the preceding concepts in relating soil conditions to special problems of the termite control operator.

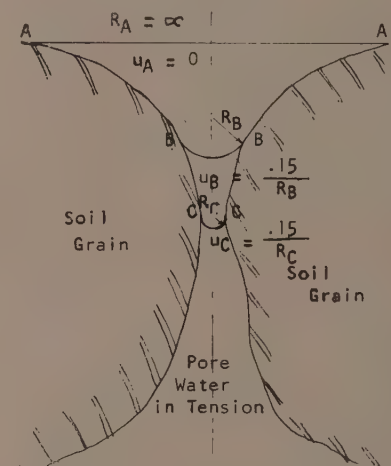
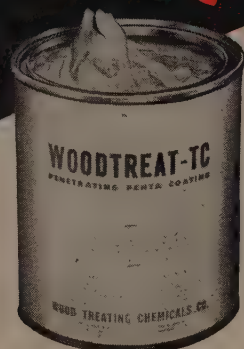


Fig. 6. Capillary tube in soil. A-A, B-B, and C-C represent the diameter of the pore, which decreases as the distance from the surface increases. R_A , R_B , and R_C are radii of curvature of the water surface at positions A-A, B-B, and C-C, respectively, as water retreats toward interior. These decrease as pore diameter decreases. u_A , u_B , and u_C represent the magnitude of tension in pore water. Since u is equal to $.15/R$, u increases as R decreases. Therefore, tension in water increases as water retreats toward the interior of the soil mass.



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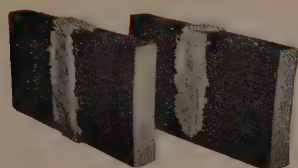
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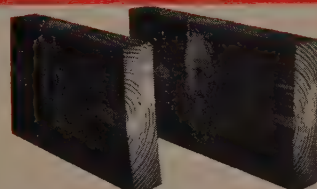
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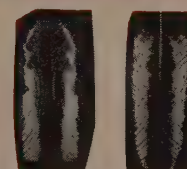
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Termite Control in MALAYA

by P. G. M. LEE

Thomas Cowan & Co., Ltd.
Singapore, Federation of Malaya

IN MALAYA, a thumb of land jutting down toward the Indonesian islands and just above the Equator, termite operators have developed their own control techniques, frequently unlike those of their counterparts in the U.S. Methods are unique because the Far Eastern operator is up against a different breed of termite. The environment is also far more conducive to these sub-soil dwellers.

Termites in Malaya build definite concentrated mud nests, often as mounds above the ground. Simple applications of poison dusts are thus one of the most effective weapons for their control. It's also the cheapest. U.S. termite nests are usually deep and diffused, and poison dusts would not be satisfactory.

Climate, Jungles Agree With Malayan "T"

A hot, humid country often swept by monsoon rains, Malaya has the climate and dense jungle vegetation ideal for termites. As might be expected, large-scale termite infestations develop in former jungle areas cleared for residential or industrial development.

Termite colonies that once existed in the soil of a cleared area usually are not, however, the source of later infestation of dwellings. These colonies are virtually wiped out when the jungle growth is cut down and huge earth-moving machines shear off the top layer of soil. All that remains to eliminate such colonies is the uprooting and removal of tree stumps. For a year or two after this clearing process, industrial buildings and residential sections of a new project may be free of termites.

But soon, winged invaders from the uncleared areas surrounding the site bring trouble. These ad-

jacent areas will have ancient, well-established termitaries which periodically send out swarms of winged colonists, the future kings and queens of new colonies. Swarms usually occur on calm evenings after a heavy rain, and the winged forms will establish their termitaries in the soil of the cleared project.

It is only during the brief period of the mating flight that termites can see. Although they shun light at all other times, they are strongly attracted by it during their mating flight. And with their clumsy wings that are shed immediately upon alighting, the termites flutter by the hundreds toward lighted houses of a new camp or young township.

That is why so many nests are found near dwellings. An ideal site for a termite colony in Malaya is below the concrete platform of a bungalow, where there is an assured water supply from cracks in monsoon drains or the seepage from bathrooms or servants' washplaces. There the termites can carry on their attack, protected from predatory creatures and from all human observers, with the exception of the trained termite operator with his poison dusts and special techniques.

Powder Application

Application of dust is simple in technique and basically a sound control measure. An ordinary bulb duster, filled with arsenic powder, is inserted into an exposed nest or a broken tube.

Blown into termite tunnels and workings, the fine arsenical powder settles on bodies, legs, or antennae of workers, is carried back to the queen, and is disseminated throughout the colony when the termites groom one another. The queen, fed by the workers, dies



Poison dust injected into a termite tube may not work in the U. S., but in Malaya, it's one of the cheapest, most effective termite control weapons that the serviceman can use.

first. All the dead are eaten, and the fecal pellets of waste matter are used to brick in the wall of the colony. In disposing of the queen's poisoned corpse, the workers also will die. The whole process takes about five days and assures the death of the entire colony. A week after treatment, re-inspection is usually necessary to be certain complete control was obtained.

Mechanical and Lethal Barriers

Other types of control used in Malaya are not too unlike those in the U.S.—establishment of mechanical or lethal barriers.

Mechanical barriers break down into four categories:

(1) Metal caps (termite shields) for wooden or concrete piles, metal or tarred building-felt flashings between tops of dwarf walls etc., and timber wall plates.

(2) Concrete "feet" for door-posts or wall posts instead of burying the ends, unprotected, in concrete or soil.

(3) Gaps between the tops of steps leading into a house and the house itself.

(4) Similar gaps between the patio (a veritable termite trap) of permanent wooden bungalows and the bungalow itself.

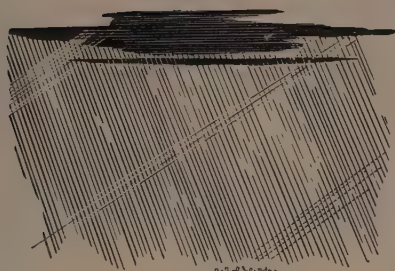
Those responsible for architectural planning and development must apply themselves intelligently and energetically to the task of modifying buildings found to be vulnerable to termite attack.

Lethal barriers are provided by use of soil poisons or toxic chemicals. These can be applied most economically and effectively while a building is under construction. The chemical to be used is poured into the foundations im-

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mediately before the concrete base is poured. The following chemicals are among those recommended in this part of the world:

(1) A solution of 5% (by weight) of pentachlorophenol in fuel oil applied at a rate of 8 gallons per 100 square feet to obtain a 1" penetration into the soil.

(2) A solution of 5% (by weight) of sodium pentachlorophenate in water applied at the rate of 16 gallons per 100 square feet, to obtain a 2" penetration into the soil.

(3) A solution of 0.5% (by weight) of dieldrin in water (i.e., 2 ounces to 2½ gallons of water) applied at the rate of 20 gallons per 100 square feet,

to obtain a 2" - 3" penetration into the soil.

(4) Sodium arsenate and water. Also effective, but dangerous to handle and requires considerable care if used in residential areas.

Of the above (1) is the most expensive, and (3) is very much cheaper.¹

Wood preservatives used should contain a toxic element such as dieldrin or pentachlorophenol. All woodwork, particularly softwoods and lesser hardwoods, should be coated with toxic preservative before and not after it

is installed in buildings. Impregnation by vacuum chambers is by far the best method.

Regular conscientious inspections are an essential part of control when mechanical or lethal barriers are used.

In Malaya, it is not practical to dig for termite colonies or to pour gallons of toxic liquids onto the soil in the hope they will soak into the colony and destroy it.

Lethal chemical barriers or spraying with insecticides will only kill a limited number of worker termites, soldiers, or nymphs. A termitary can absorb enormous casualties without risk or extinction because the queen is capable of replacing them at an astonishing rate. In a well-established colony, she is assisted by supplementary sexual types that can do just as well—the rate varies with the requirements of the colony. These methods will reduce attacks but will seldom harm the termitary. It will survive to attack again anywhere in a radius of several hundred yards. Given an adequate supply of water, availability of food, and a protected site, a termite colony is potentially immortal.

But whether the operator in Malaya uses special techniques or not, he still has something in common with his counterpart in the U.S.: the need for thorough treatment first and then conscientious, careful re-inspection at periodic intervals.

1. In reviewing this manuscript for PC, Dr. Thomas E. Snyder, international termite authority, said (1) and (2) are not considered to be as effective as the other soil poisons listed.



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Malathion Resistance in a Laboratory Strain of the German Cockroach

by G. S. BURDEN, C. S. LOFGREN, and J. L. EASTIN

Entomology Research Division, U. S. Department of Agriculture
Orlando, Florida

THE DEVELOPMENT of resistance to chlorinated hydrocarbon insecticides (Heal et al. 1953) and pyrethrum (Keller et al. 1956b) by the German cockroach (*Blattella germanica* (L.)) made it necessary to resort to other insecticides for the control of this pest. Several of the organophosphorus insecticides have been used successfully, but it has been a matter of concern as to whether resistance would be developed to this group of insecticides also. To investigate this possibility an attempt was made to induce resistance to malathion in a laboratory colony of German cockroaches, designated as the M colony.

The M colony was started with nymphs from the normal laboratory colony which were susceptible to malathion and other organophosphorus insecticides. Nymphs of each generation were exposed in a wind tunnel to contact sprays of malathion in deodorized kerosene. The survivors of this treatment were used as the parents for each successive generation. To maintain a moderate level of selection the concentration of malathion in the spray was adjusted to cause 30% to 60% mortality. Sprays containing 1% of malathion were used from the parent generation through the F_3 generation, 2% for the F_4 , and 4% for the F_5 through the F_{10} generations.

To observe the development of resistance, tests were made in

each generation with adult males which had not been exposed as nymphs to the usual selection with malathion. The male cockroaches were subjected to continuous exposures on residues of 10 mg. of malathion per square foot in pint glass jars, according to the method described by Keller et al. (1956a). The number of cockroaches dead or knocked down after various periods of exposure was recorded, and from these data the time required to give 50% or 90% kill or knock-down (LT-50 or LT-90) was computed.

The results of tests with cockroaches of the M colony and the regular colony are given in the table below. There was considerable variation in the LT-50's and LT-90's of both colonies, but the ratios showed 4- to 11-fold resistance in the M colony from the F_5 through the F_{10} generations.

The development of malathion resistance in the laboratory colony indicates that resistance to this and other organophosphorus insecticides is likely to develop in field strains of German cockroaches in buildings where these insecticides are used repeatedly in control operations.

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- Heal, E. E., K. B. Nash, and Michele Williams. 1953. An insecticide-resistant strain of German cockroach from Corpus Christi, Texas. Jour. Econ. Ent. 46(2): 385-6.
Keller, J. C., P. H. Clark, C. S. Lofgren, and H. G. Wilson. 1956a. Cockroach control. Pest Control 24(9): 12, 14, 17, 19, 20.
Keller, J. C., P. H. Clark, and C. S. Lofgren. 1956b. The susceptibility of several strains of insecticide-resistant cockroaches to pyrethrins. Pest Control 24(11): 14-15, 30.

LT-50's and LT-90's of male German Cockroaches of several generations of the M colony, and ratios to those of the regular colony, obtained in continuous exposures to residues of 10 mg. of malathion per square foot in pint glass jars.

Generation	LT-50 (hours)			LT-90 (hours)		
	M colony	Normal colony	Ratio	M colony	Normal colony	Ratio
F_1	1.5	1.4	1.1	5.2	1.9	2.7
F_2	4.0	1.6	2.5	14.1	2.9	4.9
F_3	1.4	1.8	0.8	3.1	3.6	0.9
F_4	4.3	1.3	3.3	11.7	6.6	1.8
F_5	8.1	1.4	5.8	23.2	5.2	4.5
F_6	7.6	1.2	6.3	23.1	2.1	11.0
F_7	15.8	3.2	4.9	35.1	8.2	4.3
F_8	12.0	1.9	6.3	37.0	8.0	4.6
F_{10}	8.9	1.1	8.0	15.4	2.9	5.3



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by

DR. WALTER EBELING

and

ROBERT E. WAGNER

Department of Entomology
University of California
at Los Angeles

TWO NEWER WEAPONS FOR

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THE TWO MOST destructive types of termites in California are the subterranean and the drywood. The subterranean termites, when infesting houses, require a connection with the damp soil, so as to replenish the water lost from their bodies in the dry wood. If the wood they infest is above ground but rests upon a concrete foundation, they must construct "shelter tubes" over the concrete so as to be able to periodically crawl back to the moist earth and replenish their moisture. The shelter tubes protect them from natural enemies, particularly ants. The biology and control of the subterranean termites are discussed in University of California Extension Circular 469, **Termite Control**.

The drywood termites are now about as important as the subterranean termites in southern California and extend north to the San Francisco Bay region and Sacramento. They may enter a house through the attic vents, under or directly through shingles, under the eaves, or through the foundation vents. Although most often found in the attic or in window frames, they may sometimes be found infesting the wood

members of the substructure under the house. Their presence may go unnoticed until it is indicated by piles of straw-colored to reddish-brown fecal pellets, appearing somewhat like coarse sand, which drop down from chinks or "kick-out holes" in the infested wood. Flights of the winged reproductives on days of high temperatures and bright sunshine during the fall months, particularly the month of October, sometimes are the first sign of drywood termite infestation to come to the attention of the homeowner.

Control of the drywood termite has been obtained by one or the other of two methods. When the termite infestations have been accessible and reasonably localized, the pest control operator has probed for the galleries or tunnels inhabited by the termites and injected either insecticide dusts or liquid fumigants. This is known as the "drill and treat method." For more extensive or inaccessible infestations, the infested dwellings have been fumigated with methyl bromide or other suitable gas.

A method of control was developed by the writers in which



Fig. 1. (Top photo) Woodtreat-TC, immediately after application. Thick layers can be applied with a brush. (Bottom photo) The same area of wood a month later, with scanty residue on surface.

Fig. 2. Silica aerogel, being blown throughout the attic of a residence from the "crawl hole" area, by face-masked applicator.

instead of drilling into the wood and injecting dusts or fumigants, the surface of the wood is brushed with an emulsion of 10% pentachlorophenol in a light oil, using an ordinary paint brush. This material is called "Woodtreat-TC," and is manufactured by the Wood Treating Chemicals Company of St. Louis, Mo. It has long been used to prevent damage to the substructure by subterranean termites, but its use against drywood termites in homes is believed to be new. Yet it is against the drywood termite that the emulsion may be used for actual eradication, rather than prevention of damage, for the termite colony is confined in a limited area entirely within the wood. Painting the emulsion over the surface of the infested area results in the penetration of the toxicant to the galleries inhabited by the termites and the extermination of the entire colony. The

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penetration of the toxic oil to the galleries is aided by the fact that the termites tend to burrow as close to the surface as possible, without actually breaking through, for they do not wish to expose their galleries to the outside. Therefore, some sections of the gallery are separated from the outside by only a very thin layer of wood, which is easily penetrated by the oil.

The reason an emulsion is used is because it may be applied in a heavy layer (Fig. 1). As the emulsion breaks, the toxic oil is slowly

released and penetrates deeply into the wood. A coating $\frac{1}{4}$ to $\frac{1}{2}$ inch thick gives penetration equal to 20 brush coats of un-emulsified oil.

Advantage can be taken of the juncture of two wood members, such as a ceiling joist and plate, rafter and sheathing, etc., to deposit a large quantity of emulsion where it will be held in place. The oil will then penetrate between the wood members at the point of their juncture, and, if a cut end is reached, it will pene-

trate with the grain of the wood for distances as great as 2 feet.

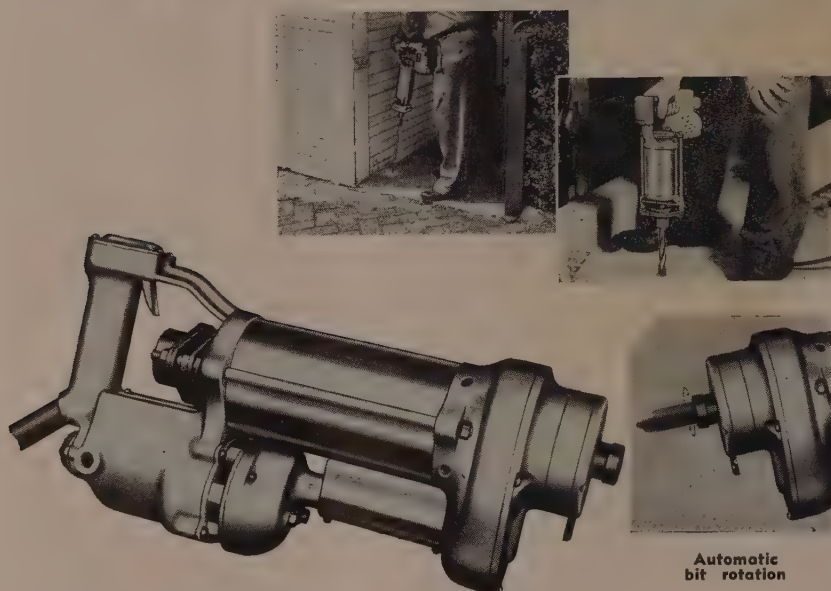
The writers have treated the attics of 13 dwellings, the substructure of 4, and 2 garages. Infested areas in these structures varied from 2 or 3 to a dozen or more and were sometimes found throughout the entire attic, substructure, or garage area. From $\frac{3}{4}$ to 2 gallons of emulsion were used, per structure, depending on how widespread the infestation happened to be. In the attics and substructures, newspapers were laid down to catch the pellets that might fall after treatment, indicating incomplete control. The treated areas were examined from one to two months after treatment.

In four of the attics and two garages, pellets were found to have fallen in appreciable amount by the time of the first inspection after treatment. This was merely the result of incomplete survey of the infested areas before the treatment was applied. More Woodtreat-TC was applied to the limited areas either missed at the time of the first application or inadequately treated. In no instance was a fresh fall of pellets found after the second inspection and application.

As compared with the "drill and treat" method of drywood termite control, the insecticide brushing method has the advantage of being more rapidly applied and more "fool proof," in that the galleries are sometimes difficult to detect and to drill into in the "drill and treat" method. Also, sometimes they are stopped up or plugged, and the dust may not follow the entire course of the gallery. With the brushing method the toxicant can be applied externally far beyond the suspected area of infestation, for the time and expense of doing so is negligible.

Compared with methyl bromide fumigation, the advantage of the insecticide brushing method is that it is more rapid, less expensive, and causes no inconvenience to the occupants of the dwelling. Also, incomplete results or reinfestations can be quickly and inexpensively rectified by second applications of the emulsion, whereas a second fumigation would be almost out of the question because of the great expense. A further advantage of the Woodtreat-TC application method is that the residual toxicant remains in the wood whereas the gas is

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dissipated, and, therefore, has no residual effect.

Precautions

Although Woodtreat-TC has been applied extensively without the use of gloves or masks, the writers recommend that those applying this material should wear chemical-resistant gloves, in order to avoid contamination of the skin. If the skin is accidentally contaminated, the material should be removed by means of soap and water. A mask designed for removal of organic vapors should be worn.

The success of the experiments with drywood termites indicated the possibility of utilizing Woodtreat-TC for the control of subterranean termites, as well. An extensive series of experiments was

How to Repel Rabbits

From Plants in Winter

Cornell University researchers have developed a resin mixture which they say will repel rabbits from plants and shrubs during the winter.

The compound consists of seven pounds of powdered resin mixed in one gallon of ethyl alcohol. This should stand in a warm place for a day or two, then be painted on dry bark before snow sets in. A gallon will reportedly protect 100 small trees all winter.

For small-scale rabbit problems, the researchers suggest chicken wire enclosures.

initiated. Preliminary results appear promising and a report on

the completed series of experiments can be expected at some future date.

Preventive Treatments With Silica Aerogel

The incidence of drywood termite infestation in southern California is so high that reinfestation, even within a year after treatment, is not uncommon. Therefore there has long been evident a need for a treatment, applied in conjunction with or immediately after the control treatment, which would prevent reinfestation. The clue to such a treatment was offered by the observation that certain inert dust diluents are more effective against drywood termites than existing formulations of insecticide dusts. Moreover, the effec-

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The City Attorney in Little Rock, Ark. has ruled any home repair job in the city requires a permit if repairs amount to \$10 or more. Unless you are fully acquainted with similar regulations in your city, it would be wise for you to check up on them especially if your termite control work in Little Rock includes any kind of replacement or repairs in a home.

tiveness of these materials does not appear to diminish from long periods of exposure to air and high temperature, for they kill the insects by physical rather than chemical means. They absorb the thin protective layer of wax off the bodies of the termites, causing them to die because of rapid desiccation (Ebeling, Pence and Wagner, 1958).

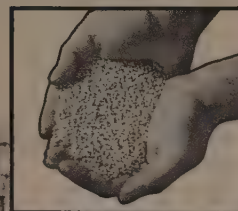
Certain sorptive clays were found to be among the most effective of the existing insecticide diluents and one of these, known as "Olancho Tox,"¹ was registered for use as a termite preventive, to be applied in attics at the rate of 5 pounds to 1,000 square feet of attic area. Sorptive dusts were blown throughout the attic from the crawl hole, using an electric blower (Fig. 2). Although Figure 2 shows the operator entirely inside the attic, the dust may also be applied with only his head and shoulders above the crawl hole, making his withdrawal from the attic rapid and convenient. Experience has showed that air will move upward through the crawl hole, so it is not necessary that this opening be closed during the brief period required to apply the dust. The dust should also be blown under the house, for drywood termites often attack wood members of the substructure.

Research was continued and materials were sought that might prevent termite infestation with even lower dosages of dust. For comparative tests, three blocks of wood were hung in various parts of an attic and taken down after exposure to the dust. They were placed in 100 ml. beakers and 10 termite alates or full-grown nymphs were placed in each of the 3 beakers to determine the period required for

1. Courtesy of Los Angeles Chemical Company.

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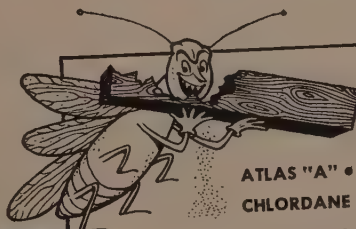
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100% "knockdown" of the termites and 100% mortality. On the average, the period required for knockdown or death of the alates was only about 70% as great as that of the nymphs.

To date, experiments with dust desiccants have been made in 20 residences. These include the 13 that were first treated with Woodtreat-TC, as described above, and 7 that were first fumigated with methyl bromide.

In no case did the termites do any feeding on the dusted wood. Soon after the experiments were begun it was found that silica aerogels killed termites more rapidly than clay, even when used at a much lower dosage.

Silica aerogels are amorphous and extremely small particles that are prepared by the reaction of sodium silicate with sulfuric acid. A "hydrogel" is formed and when this is dried, air takes the place of the water without changing the structure of silica. The dry material can then be ground to particles of extremely small size. For example, one brand has particles of an average size of 3.5 microns, but they themselves are porous and have great sorptive ability.

Silica aerogels have been used primarily as "flatting agents" in the paint industry. For certain industrial reasons it has been found desirable to "coat" them with small percentages of certain inorganic compounds, which have the effect of giving them a positive charge, thus increasing their depositing properties. In addition, insecticidal effectiveness has been greatly increased by the coating. The coated materials were found to be so superior to the uncoated products that they were henceforth used exclusively in experimental work, not only with termites, but with a number of other insect and mite pests. With the coated silica aerogels it makes little difference how much moisture there is in the atmosphere, up to and including 100% relative humidity. If the dust deposits are wet and later dried, they are less effective because they are not "picked up" as readily by the insects.

Examples of the superiority of the coated silica aerogels are provided by three typical experiments. In one test a silica aerogel, now designated as "Dri-Die 67"² was used at 1 lb. per 1,000 sq. ft. of attic space and was compared with 6.4 pounds of Olan

Table 1. Comparison of Dri-Die with Olan

Material	Pounds per 1,000 sq. ft.	Date Treated	Date Exposed to Termites	Knockdown (Hours)	Mortality (Hours)
Dri-Die 67	1	5-22-58	5-23-58	1.5	4.8
Olan	6.4	"	"	6.0	12.5
Dri-Die 67	1	9-9-58	9-10-58	3.5	14.3
Chlordane	2	"	"	35.0	63.0
Dri-Die 67	2	"	"	1.7	4.7
Chlordane	4	"	"	8.5	24.0
Dri-Die 67*	2	"	10-14-58	1.9	3.9
Chlordane*	4	"	"	24.3	33.3

*The blocks of wood from the previous treatment were placed back in the attic and termites were placed on them again 35 days after treatment.

Tox. In another test Dri-Die 67 was used at 1 lb. per 1,000 sq. ft. and 5% chlordane was used at 2 lbs. In a third test the latter two materials were used at 2 lbs. and 4 lbs., respectively, to 1,000 sq. ft. of attic space. The reason for using 5% chlordane dust in these tests was that it was the most common of the insecticides used for attic dusting since this method was suggested in 1956 (Ebeling and Pence, 1956). In the last test, the blocks of wood were placed back in the attic and termites were again placed on the same blocks 35 days after treatment. The results of the experiment are shown in Table 1.

Table 1 shows that Dri-Die 67 is greatly superior in its immediate effectiveness to Olan and 5% chlordane dust, even when used at lower dosages. With respect to the chlordane dust, it should also be borne in mind that at the high temperatures encountered in an attic in the fall, the period when the alates fly, insecticides are rapidly decomposed. The day following treatment the ratio of the period required for 100% knockdown from Dri-Die 67 and chlordane was 1 to 5.0 and the ratio of the period required for 100% mortality was also 1 to 5.0. When comparisons were made 35 days after treatment the above ratios had increased to 1 to 12.8 and 1 to 8.5, respectively. Probably within the 35-day period the 5% chlordane dust had reached the degree of effectiveness that might be expected of its diluent alone, which is pyrophyllite.

The superiority of Dri-Die 67 as a preventive, as shown in Table 1, is typical of 10 experiments in

which it was compared with other dusts, including other types of aerogel.

Although this paper deals with termite control, it may interest the reader to know that Dri-Die 67 was found to be effective in the control of German, Oriental, and brown-banded cockroaches in extensive field tests, and in addition it shows promise in the control of bees and wasps colonizing in attics and walls of houses, fleas on pets and two-spotted mites on roses in the experiments made by various staff members in the Department.

Precautions

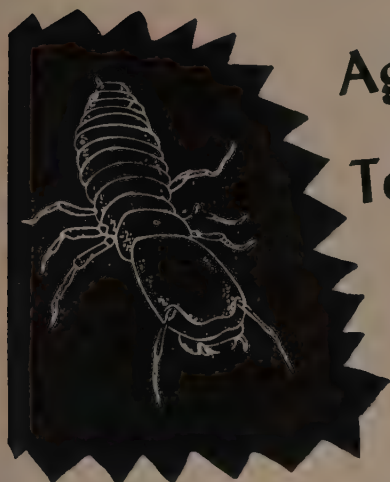
Experiments with laboratory animals and the experience of workers handling the amorphous silica aerogels in their preparation and packaging, as well as in connection with their use as flatting agents, pigment reinforcers, mold lubricants, grease-thickening agents, and dry-grinding aids, indicate that the silica aerogels will not be hazardous to the health of those who may apply the dusts or to the occupants of treated premises. Nevertheless, they may be irritating when inhaled, so a dust respirator, such as shown in Fig. 2, is recommended for those who apply the dust. However, this is a desirable procedure for any kind of dust, regardless of how innocuous it may be.

Literature Cited

- Ebeling, Walter and Roy J. Pence. 1956. UCLA entomologists evaluate research data on drywood, subterranean termite control. *Pest Control* 24(10): 46, 50, 52, 54-58, 62, 64.
Ebeling, Walter, Roy J. Pence, and Robert E. Wagner. 1958. UCLA termite research with chemical, physical barriers; inert diluents. *Pest Control* 26(3): 50-52.

2. Courtesy of Davison Chemical Company, Baltimore 3, Maryland.

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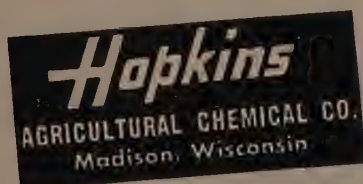
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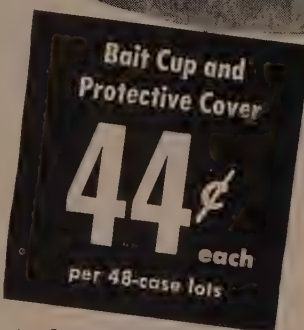
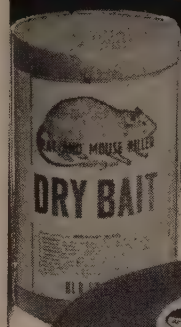
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A properly prepared operating statement is a tool which enables the business man to see where he has been, and to predict with reasonable accuracy where he is going. This record must possess three basic qualities in order to justify itself. It must be accurate, adequate, and understandable. Inaccurate records are worse than none at all because of the distorted picture they present. Such accuracy has to start right with the serviceman in completion of his work reports and service receipts.

Incomplete or inadequate records are on a par with inaccurate ones as far as negligible worth is concerned. If they do not present the entire picture, then distortion results which erases all value of planning.

Departmentalize Office Jobs

Where multiple services are sold, first step before an operating statement can be prepared is to departmentalize operations so revenue and cost can be allocated to the proper department. Only in that way can the operator have visual evidence showing which operation is functioning in the red and which is in the black. One weak department operating at a regular loss can soon sap the organization of its operating capital and time. That's why the only justification for a particular service is: does it show a profit, or can it show a profit?

In pest control operations all revenue and related cost must be allocated to that department and at the end of the fiscal period an operating statement prepared to show what has happened in the department, regardless of what took place elsewhere. The same holds true for the termite department, weed and brush department, as well as administrative and sales divisions. A master operating statement, consolidating all departmental statements,

will reflect the over-all operation.

In the pest control department, revenue should be broken down into three classifications: regular monthly service, initial work, and job work. Such a breakdown tells the operator one important thing—whether regular monthly service and initial work show a healthy increase. A lot of job work in a particular month helps total revenue, but it is a non-recurring factor. It is regular monthly accounts, plus new contracts, which keep revenue up month after month.

In the termite department, revenue should be classified into initial work and renewals. This gives just a little better picture of operations and permits the termite manager to plan his work more effectively.

Revenue from the retail sale of products should be separated from other sources of income.

Obviously, revenue figures should not include any state or municipal sales tax, since the operator merely acts as a collector and such money represents a liability of the company to the taxing agency.

Breakdown of Expense Items

These are all the items of expense. Now let's discuss each briefly, keeping in mind every expense is allocated to its related department.

Travel—Expenses incurred by servicemen and officers while on company business, for which they are to be reimbursed. Such items are expenses for lodging, meals, parking, postage, plus miscellaneous tools and supplies.

Cost of Materials—When feasible, servicemen should secure their supplies from a central company warehouse where systematic controls can be exercised over use of materials. Issue of materials should be confirmed by some type of invoice with each serviceman taking a physical inventory of his

materials on the truck at month's end. Use of materials must be controlled—first, by a proper system of check out and, second, by training in efficient application of materials. This expense should be watched closely; otherwise it could get completely out of hand.

Salaries and commissions—This is probably the axis upon which a successful business revolves, and it alone can often determine success or failure. Decisions on personnel are necessary to keep this figure at a safe level, and absolute planning is a necessity in order to fully utilize labor. No one should be so restricted in his "know how" that he could not be used in more than one department. When general pest control activity is slow, the labor could be shuttled over to termite work or to the weed control department. Likewise, when termite crews do not have a full schedule of work, they can be used in another department.

Allocation of salaries to the related department can often be a problem when a man is active in several fields. Generally, company officers are engaged in sales activity, direct supervision of work being done, and many other things. Allocation of such salaries will have to be based on degree of activity in various departments.

Commissions paid to servicemen are included in this type of expense. It may be that a serviceman is paid a certain percentage of total billing, plus a percentage of over quota. If a serviceman sells a termite job and gets a commission on the sale, how should this commission be charged? It should be allocated to the sales department and not to the pest control or termite departments.

Advertising—By and large, this element of expense is self-explanatory. It should include telephone directory advertising and sales materials.

Depreciation—Monthly depreciation on furniture and equipment, other than vehicles, should be charged to the administrative department. Of course, depreciation on cars and trucks should be

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charged to the related department.

Utilities, dues and subscriptions, and donations—These three expense items should all be charged to the administrative department.

Professional fees—Fees for C.P.A. services or legal services fall into this category and should be charged to the administrative department.

Office supplies, rent, and postage—All three of these expenses can be charged to the administrative department.

Tools and supplies, and maintenance—Expendable items such as drill bits, flashlights, and batteries are chargeable under this expense heading to the related department. Maintenance on office equipment should be charged to the administrative department, but maintenance of other equipment, or repairs on that equipment, should be charged to the related department.

Insurance—General insurance expense on furniture and fixtures, and inventory can be charged to the administrative department. Workmen's Compensation Insurance and general liability insurance are usually based on revenue and can be charged to the related department. With respect to general insurance, it would not be in order to charge the premium for a full year, or for a three-year term, in any one month. The expense charge for any one month should be a pro rata part of the premium. For example, a one-year premium of \$120.00 would not all be charged in the month it was paid. Expense for each month would be \$10.00.

Real estate taxes—This expense is chargeable to the administrative department and, like insurance, should not all be charged in one month. The charge should be distributed equally for the year, or 1/12th each month.

Finance expenses—These expenses normally consist of bank charges and interest on loans. It would not be proper to charge as expense the entire amount of interest on money that the company borrowed in any one month. An example will illustrate this point. Suppose the company borrowed \$10,000 for one year at 5% interest. The amount of interest for one year is, therefore, \$500.00 and 1/12th of that figure should be charged each month as finance expense.

Preparation of Operating Statement

At this point we have set up revenue and expenses for the month, which make possible the preparation of an operating statement. This statement sets forth net profit or loss for the month, but it must be carried one step further. A great many businesses, and justifiably so, are becoming very cost conscious. They want to know exactly how much it costs to produce \$1 of revenue, as well as percentage of individual expense items to the revenue dollar.

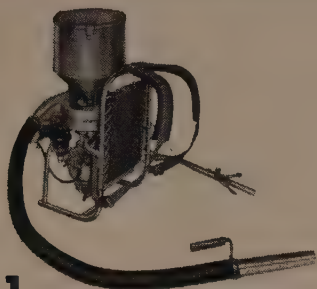
It is necessary to set up a percentage analysis of each element of expense to income. This gives a better picture of operations than just a dollars and cents operating statement. Increased volume does not always produce a proportionate increase in net profits. As income volume goes up, certain expense figures may increase at a greatly accelerated pace. Sometimes a point of diminishing returns is reached, where the cost dollar is producing less and less revenue. For example, an operator has an annual revenue of \$300,000 with an acquisition cost of 94%, which represents a net profit of \$18,000. Another operator with an annual revenue of \$400,000 has an acquisition cost of 96%, or a net profit of \$16,000. In the process of acquiring the additional \$100,000 of revenue, the second operator has incurred greatly increased costs, which have not produced their fair share of revenue.

Monthly cost analysis reports can forewarn management when it is approaching the point of diminishing returns. In my opinion, a report showing percentage of various expenses to income is the most valuable statistical tool management can have at its disposal. However, such a report should be on a monthly basis; and, in addition to showing cost revenue statistics for that particular month, it should present the same data for yearly operations to date. Management can then pinpoint expenses which for any one month would be out of line with the year's average.

A report of this nature on a monthly basis does another thing. It permits the operator to correct an unhealthy cost situation right at its beginning, rather than having to do a major overhauling when the situation has existed for a period of time and has become critical.

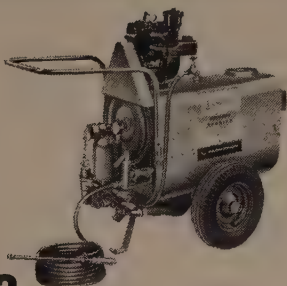
ATTENTION P C O'S

Here are 3 **POWERFUL** Reasons for Choosing
Root-Lowell Sprayers & Dusters*



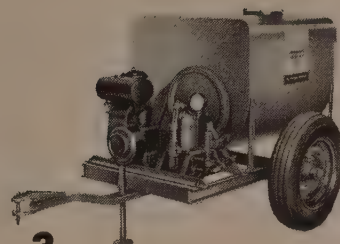
1
Model 4601 Nap-Sak®
Power Duster

Portable power duster with 2 h.p. two cycle gas engine, rewind starter. One and two outlet models. Weight 42 lbs. empty, 67 lbs. filled. Finger-tip engine and discharge control allows precision application at high volume and high speed over large areas. Easily carried with wide, padded shoulder straps. Many in use by PCOs for dusting unexcavated areas, attics, lawns. 2" O.D. dust tube. Mist attachment available as accessory.



2
Model 63030 Spraycat®
30 Gal. Power Sprayer

30 gallon tank with single piston pump that has new spring-loaded poppet valve with nylon sleeves and discs; extremely tough, almost wearproof against corrosive chemicals. New Jet-O-Matic® agitation. Handles all sprayable solutions. Available gasoline or electric powered models. Rolls easily on pneumatic tires. Other models available in 15, 50 and 100 gallon sizes.



3
Model 67150 Spraycat®
150 Gal. Power Sprayer

150 gallon tank with two-cylinder pump powered by 7 h.p. engine. Has new spring-loaded poppet valves with nylon sleeves and discs, highly resistant to spray chemicals. Delivers 8 gallons per minute at pressures up to 450 pounds. Power-Matic® mechanical agitator keeps heaviest spray materials properly mixed. Handles all sprays, from oil emulsions to heavy sediment bearing materials. Also available in skid-mounted model.



Trade Mark

*These are only 3 examples. Write for Catalog No. 90, compiled especially for Pest Control Operators and showing our full line of sprayers and dusters.

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94% ACTIVE ELEMENTS

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What's NEWS In The Industry



Irradiation Curbs Mosquito Populations, USDA Reports

Male mosquitoes sterilized by irradiation with Cobalt-60 have proved experimentally effective in reducing populations of *Anopheles quadrimaculatus*, a malaria-carrying mosquito, according to U. S. Department of Agriculture entomologists.

Control amounting to about 80% under laboratory conditions was revealed recently by scientists A. N. Davis, J. B. Gahan, Donald E. Weidhaas, and Carroll N. Smith, of the USDA's Agricultural Research Service. They conducted their experiments at Orlando, Fla., using laboratory-reared mosquitoes known to be free of malaria.

"Considerable effort," Davis said, "is devoted to anti-malarial campaigns. In this connection, irradiated, malaria-free mosquitoes might be released to apply the final blow to a population already depleted by other control measures. In such cases, the new method might get survivors that could not be eradicated by any other means."

Davis indicated, however, that practical use of irradiated male mosquitoes as a control measure poses problems of cost, labor, and methods of large-scale rearing and irradiation. Over-all practicality, he concluded, would depend on the size of the area to be treated, abundance of normal mosquitoes, importance of obtaining complete eradication, and financial resources available.

USDA Registers Phostoxin

Phostoxin, the new tablet-form phosphine grain fumigant (PC, Sept. '58, pg. 44), has been registered on a no residue basis by the U. S. Department of Agriculture, according to J. Wilfred Gunn, Hollywood Termite Control Co., Los Angeles, Calif. Gunn sponsored Phostoxin's introduction into the U. S. from Germany.

Fry Is Choice of Va. PCOs

LaMarr Fry, Orkin Exterminating Co., Inc., Norfolk, was elected president of the Virginia State Pest Control Association for 1958-59 at the association's an-

nual meeting in Blacksburg late last year.

Serving with Fry are Irving Brussell, Brussell Exterminating Service, Washington, D. C., the new vice president; and Lee Chambers, Aldridge & Chambers, Inc., Virginia Beach, secretary-treasurer.

Pa. PCOs, Sanitarians To Meet

Dr. Frank B. Clack, Chief Public Health Veterinarian, Allegheny County Health Department, is scheduled to discuss "Bat Rabies Hazard to PCOs" February 12 at the annual joint meeting of the Western Division of the Pennsylvania Pest Control Association and the Allegheny County Sanitarians.

The meeting will be held at the Roosevelt Hotel in Pittsburgh, according to association secretary, Harry Katz, Elco Manufacturing Co., Pittsburgh.

Stroube Resigns Tex. PCA Post

Esthel O. Stroube, executive secretary of the Texas Pest Control Association since 1957, has resigned that position to become a contracts administrator for Almond Electric Co. of Dallas and Harrisburg, Pa. He is succeeded as association executive secretary by C. Hal Jones of Dallas.

Jones, a native of Texas, is also executive secretary of the Dallas Executives Association. His address is 2742 Southwood Dr., Dallas 33, Tex.

Arwell Names Technical Head

J. C. Frankenfeld, long associated with the grain industry, has been appointed Director of Technical Service for Arwell, Inc., Waukegan, Ill. He is to assume responsibility for all phases of technological and entomological activities involved in Arwell's pest control service program.

Orkin to Appeal \$90,000 Florida Circuit Court Judgment in Favor of Truly Nolen, Inc.

Perry Kaye, Orkin Exterminating Co., Inc. vice-president, informed PC Orkin is appealing the Dade County Florida Circuit Court December 11, 1958 ruling in which Orkin Exterminating Co. of Florida, Inc. was ordered to pay \$90,019.01 to Truly Nolen, Inc., of Miami, Fla., for allegedly unlawfully enticing employees away from Nolen.

Circuit Judge Pat Cannon ruled in a 19-page decree that Orkin "induced and enticed" a "unique and irreplaceable" supervising entomologist, Albert Snyder, from his job with Nolen.

The Court fined Taft Pierce, a former Nolen employee now said to be Orkin's \$31,000-a-year Miami area manager, \$7,500 for getting Snyder to breach his five-year written contract of employment with Nolen.

The Court found Snyder, after he had entered into the five year agreement with Nolen, did not voluntarily seek employment with Orkin and would not have breached and abandoned his contract with Nolen had it not been for the defendant's action.

Snyder was enjoined from engaging in the pest control business within the Dade County area until March 5, 1959 when his contract with Nolen will reportedly have expired.

Nolen, the judge noted, had to close three of six branch offices in the Dade County area because Orkin had hired away three Florida licensed PCOs required by state law to man such offices. Judge Cannon said Orkin used these former Nolen employees' pest control licenses for Orkin branch offices elsewhere in the state.

The biggest part of the fine, \$75,000, was punitive damages.

Judge Cannon wrote in his decree, "it is undisputed as shown by the testimony and exhibits that for the proper protection of a company such as Nolen or Orkin engaged in the pest control, exterminating, fumigating and termite control business, the business requires secrecy in connection with the methods and systems employed, and that for the proper protection of the company, it is absolutely neces-

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ON EVERY PEST CONTROL JOB

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EXACTLY where
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Carbide-Tipped
E-Z STARTER POINTS

... when using
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CONCRETE-TERMITE Drills

Get the greater drilling
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Multiple-Cutter Drills plus
the hole-starting ease and speed
of single-cutter drills.

For Concrete Termite
Solid-Body Drills

For Concrete-Termite
Core-Style Drills

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Core-Style Drills
over 1 1/4" diam.

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DRILLS give you:

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sary and essential that all matters connected with, arising out of, or pertaining to the business of the company, its methods and systems and the names of its customers, the addresses and prices, be kept secret and confidential. It is undisputed that by virtue of employment, the personnel will become possessed of the knowledge of the names, addresses and prices of customers of the employer within the territory worked by the employee and the methods, systems, techniques processes and formulas employed by the employer. The nature of the employer's business and the training received by the employees are of a confidential and secret nature and should not be disclosed or revealed to any competitor. That is one of the reasons why restrictive covenants have been inserted into Nolen employment contracts with its employees and the Orkin employment contracts with its employees. The contracts of employment used by Orkin Exterminating Company of Florida, Inc. are similar to the Orkin contracts used by the national Orkin organization which Orkin has asked courts of other jurisdictions to enforce because of the confidential matter, trade secrets, etc."

The judge said the Orkin organization, consisting of a parent and numerous subsidiaries is in the pest control and exterminating business, operates on a nationwide basis and has several hundred branch offices. "It is undisputed," the Court said, "that Orkin firms are worth in excess of \$20,000,000."

Nolen has been engaged in the pest control business in Dade County, Florida for over 10 years and prior to incorporation, the president, Truly Nolen, had been engaged in the same business for 11 years.

Orkin's vice-president Perry Kave told PC the reason for Orkin's decision to appeal the case was based upon the fact that Orkin felt the "decision was wrong."

Prentiss Names Sales Rep.

R. Peltz Co., Philadelphia, Pa., has been appointed exclusive sales representative for Prentiss Drug & Chemical Co., Inc., New York, in the Philadelphia, Baltimore, Md., and Washington, D.C. area.



"Built-in" cheese aroma is the main feature of this new rodent bait station. The synthetic cheese odor is suspended in a wax base. The scent paddy, reportedly effective for two years, is protected in storage and shipment for the buyer by a removable tear-off seal.

Cheese-Scented Rodent Station

A new cheese-scented, tray-and-cover type rodent bait station for use with dry meal bait is being offered by Hub States Chemical & Equipment Co., 1255 N. Windsor St., Indianapolis, Ind.

The cheese aroma is said to be so strong that it attracts rats and mice from all other types of bait; is effective even when the station is placed in grain storage elevators where rats and mice may ignore ordinary bait stations for larger quantities of non-poisoned food available.

Lightweight, the molded plastic station has special stacking grooves for compact storage of one station inside another. It is clearly marked for poison, and has staking flanges to meet government regulations for safety. Stations are available in case lots only.

For more details, write Hub States.

USDA Film on Pests, Diseases

"The Hidden Menace" is the title of a new 16mm, sound, color motion picture on pests and diseases, released by the U. S. Department of Agriculture's Motion Picture Service. Running time is 23 minutes.

The film demonstrates how pests and diseases can be unwittingly carried from one country to another, and shows what persons can do to help combat this menace. Cleared for television showing, "The Hidden Menace" is available for loan or purchase.

For more information, write Motion Picture Service, Office of Information, U. S. Dept. of Agriculture, Washington 25, D.C.

American Mosquito Control Assn. '59 Meeting in Salt Lake

The Annual Meeting of the American Mosquito Control Association is scheduled for April 12-15 in Salt Lake City, Utah's Hotel Utah.

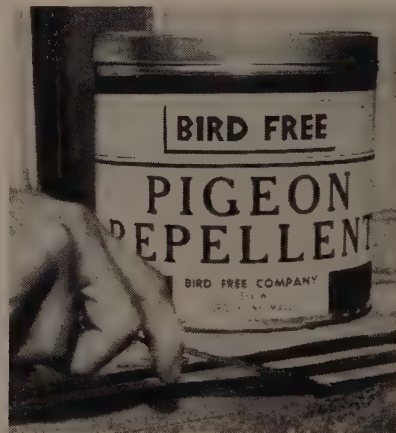
One of the program features is to be a "Paired Papers Session" in which authorities will cover pros and cons of various controversial issues, such as mosquito control vs. wildlife. A more informal, round-table discussion, featuring talks of specialized interest, will highlight a "Special Papers Bull Session."

Among papers to be presented is one by AMCA past-president, Don Reese, on mosquito problems in Indonesia; another, by George Pearce of the Communicable Disease Center on chemical research in relation to mosquito control.

AMCA members and other mosquito control personnel may attend. For complete program and registration details, write meeting chairman, A. D. Hess, U.S. Public Health Service, P. O. Box 625, Greeley, Colo.

Harrison Heads Ark. PCA

New president of the Arkansas Pest Control Association for 1959 is James Harrison, North Little Rock Health Department. Elected with him at an association meeting in Little Rock recently was vice president, Henry M. Thomas, Jr., Thomas Pest Control, Little Rock; and secretary, David Anderson, Evans Laboratories, Inc., Little Rock.



"Bird-Free Pigeon Repellent," is a new all-weather compound that requires no special application equipment. Applied in strips 1" wide by 1/4" deep on roof ledges, eaves, sills, or other roosts, a 5-pound container of Bird-Free reportedly will protect 250 linear feet against pigeons and other birds by making it uncomfortable for them underfoot. According to the manufacturer, it does not injure birds, is safe to human beings. For additional details write the manufacturer: Bird-Free Co., Box W, Brookline 46, Mass.

WONDER RAT BOARDS



a
new type
trap
to solve
difficult
rat
problems

A felt base with a specially prepared adhesive that is non-drying or hardening. Catches rats like flies on fly paper! Remains active indefinitely. Safe to use. No poisons required. Ideal for use in Food Plants, Warehouses, Etc.

\$12.00 a dozen

SPECIAL PRICES TO THE TRADE:

6 dozen (72) \$9.00 per dozen
12 dozen (144) 7.50 per dozen

WONDER RAT GLUE

Sold in bulk so you can make your own rat boards
6" x 6" for mice - 9" x 11" for rats are usual sizes

25 lbs. \$.80 per lb.
50 lbs. 78 per lb.
100 lbs. 75 per lb.

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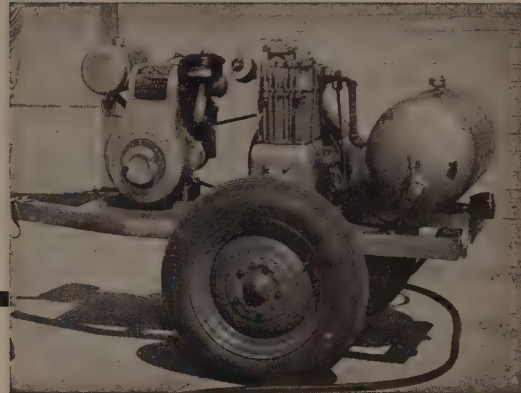
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B&G C-100 TERMITE DRILLING UNIT

Tested on the job and proved by experts . . .
this powerful unit packs the punch you need
to make your job easier . . . and faster!

**DRILLS 3" OF
SOLID CONCRETE
IN 30 SECONDS!**

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Unit is complete with 14-lb. self-rotating jack hammer, 2 drills, 100-ft. air hose and all couplings.

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23 Dean St., Brooklyn 1, N.Y.

DuPont Renames Weed Killers

Two new trademarks have been adopted by E. I. duPont de Nemours & Co., Inc., Wilmington Del., for neburon and fenuron, members of the family of substituted urea herbicides, and changes are announced in the use of the two trademarks "Karmex" and "Telvar" for diuron and monuron.

The new trademark "Kloben" now identifies neburon weed killers (formerly "Karmex" N), and the trademark "Dybar" now applies to fenuron weed and

brush killers. Fenuron weed and brush killer was formerly known as "Karmex" FP.

"Telvar" will now identify only products based on monuron, and "Karmex" will identify only products based on diuron. Up to now the trademark "Karmex" has distinguished all agricultural herbicide formulations of the substituted urea herbicides. The trademark "Telvar" has been used to designate industrial formulations. Under the new nomenclature, all appropriate recommendations will be included on each label.



Contains pertinent portions of the Department of Agriculture's Cooperative Economic Insect Report, material from university entomology departments and reports from readers. PCOs noticing infestations in their own areas are urged to communicate with Pest Control so their information may be added to this infestation report.

AN ANT

(Cardiocardyla nuda minutior)

California: Medium in a concrete terrace in San Diego, San Diego County. This is first report of this ant from state.

BROWN-BANDED ROACH

(Supella supellestium)

Maryland: Troublesome to home owners in Westminster, Rockville, and Silver Spring.

CARPET BEETLE

(Anthrenus scrophulariae)

Texas: Found in attic of Bexar County residence.

EARWIGS

Louisiana: Heavily infested slab homes in Jefferson and Orleans Parishes.

ELM LEAF BEETLE

(Galerucella xanthomelana)

Oklahoma: Beetles entering homes in Stillwater area.

IMPORTED FIRE ANT

(Solenopsis saevissima richteri)

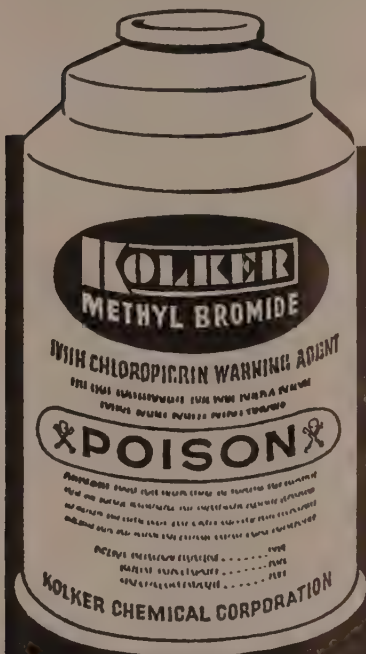
Alabama: Nearly 26,000 acres treated. **South Carolina:** Horry County found infested for first time.

MILLIPEDES

Louisiana: Heavily infested yards and driveways in Baton Rouge.

A SUBTERRANEAN TERMITE

Utah: Damaged a home at Ephraim, Sanpete County.



KOLKER METHYL BROMIDE

Now being produced at our modern plant in Newark, N.J., Kolker Methyl Bromide is the outstanding fumigant for the elimination of insect and rodent infestation of grain, tobacco plant beds, seeds, dried fruits, cereals, nursery stock and a wide variety of other products.

KOLKER METHYL BROMIDE

- Kills insects, mites and related pests in all stages of their development.
- Has a high degree of toxicity to a wide range of insects, rodents and other pests.
- Has rapid volatilization and a high rate of diffusion into stored grain, bales, packages and soil.
- Is non-explosive and non-flammable.
- Does not leave any residual odors, tastes or stains.
- Is economical to use.

KOLKER Methyl Bromide is packaged in one-pound cans, packed 24 per case for domestic shipment and 48 per case for export.

It is also available in cylinders of 50, 100, 150 and 450 pounds net capacity.

KOLKER Methyl Bromide may be ordered as a 100% product or with 2% chloropicrin warning agent.

For further information on this highly effective fumigant, please call or write us today.



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Remedies Fire Ant Sting

Benadryl, one of the world's first antihistamines, has proved successful in treating adult victims of stings from imported fire ants, according to a report from the U. S. 3rd Army Medical Laboratory, Fort McPherson, Ga.

Captain F. G. Favorite, chief of the 3rd Army Entomology Section, in a published account (Public Health Reports, Vol. 73, No. 5, May 1958) states Benadryl is useful in combatting painful sting reactions in adults and large children.

Transland Aerial Brochures

Newly revised brochures are now available describing Transland Aircraft's complete line of dust and liquid spray aerial applying equipment for agricultural pest control. For copies of brochures and a price list, write Transland Aircraft, P.O. Box 45545, Airport Station, Los Angeles 45, Calif.

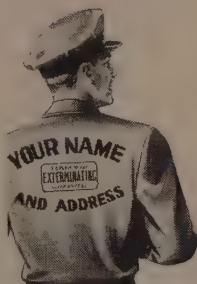
Technical Director

We have a very important position for an outstanding man, with entomological and chemical background and a record of successful accomplishment, to head service department of rapidly expanding pest control firm with home offices in Pittsburgh. This is an important position for a man with experience and possessing managerial ability plus. Remuneration to meet full expectations plus opportunity for profit-sharing interest. This is an unusual opportunity for the right man. All replies strictly confidential. Submit account of academic and professional training, past affiliations, earnings, photo and any other pertinent facts to:

L. L. Crosby, President
Commonwealth Sanitation Company
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Yes, the low-cost of ELIN Uniforms is much more than an investment in good appearance! The smart, neat work uniforms also help to increase efficiency and add prestige to your business as they advertise your product. Write today for FREE catalog showing styles, prices and samples of fabrics.



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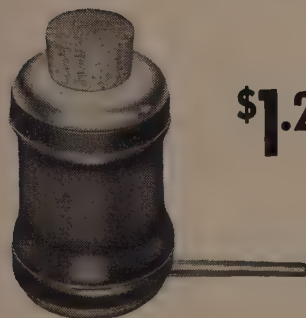
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TERMITE CONTROL CHEMICALS

- ★ Magnolia **DIELDRIN**
18-62/100% by weight
- ★ Magnolia **CHLORDANE**
46% - 74% Water Miscible
22% Oil Solution
- ★ Magnolia **PENTACHLOROPHENOL**
44%

Magnolia Has A Complete Line of PCO
 Chemicals

Orders Shipped Same Day Received

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DAMATAM E40
 40% Roach Concentrate?

MAGNOLIA

CHEMICAL COMPANY OF TEXAS, INC.

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Dallas, Texas

Insecticide Use, Mosquito Larvae Subjects of 2 New CDC Films

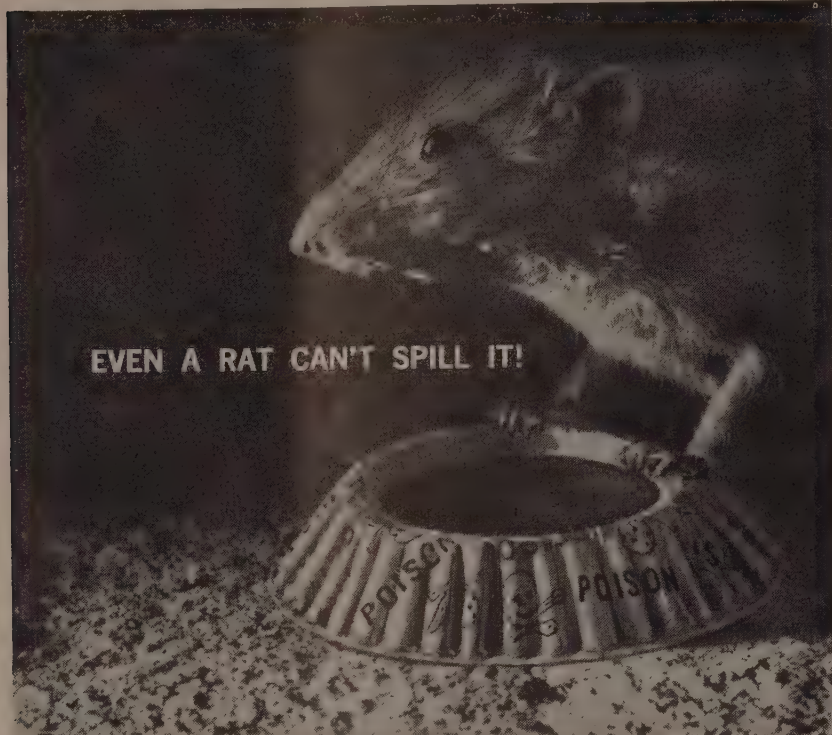
A 35 mm color, silent filmstrip and a 16mm color, sound motion picture of interest to PCOs and mosquito control personnel are now available for short-term loan in the U. S. from the Communicable Disease Center. Both have been cleared for television.

Entitled "Health Hazards of Pesticides (M-204)," the motion picture has a 14½-minute running time. It emphasizes the po-

tential public health hazards in the widespread use of pesticides, and how to use them safely.

The filmstrip is titled "Mosquito Larval Habitats (FS-190)" and has 74 frames. In it, various types of mosquito larval breeding places are shown, and larval habitats are classified, as related to mosquito surveys.

Each is available for short-term loan in the U. S. from: Chief, Communicable Disease Center, Public Health Service, P. O. Box 185, Chamblee, Ga.



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*T.M. Pat. Pend.

Calendar

Texas Agricultural Chemicals Conference, Texas Tech College, Lubbock, Feb. 10-12.

Fifth Annual Joint Meeting, Western Division of Pennsylvania Pest Control Assn. and Allegheny County Sanitarians, Roosevelt Hotel, Pittsburgh, Feb. 12, 8:30 p.m.

Pest Control Operators of California, Inc. State Convention, Hotel Claremont, Berkeley, Feb. 12-14.

Arizona Pest Control Assn. Winter Meeting, Westward Ho Hotel, Feb. 14, 1 p.m.

Washington, D.C. Pest Control Assn.'s February Meeting, 4904 Wisconsin Ave., N.W., Feb. 16, 8 p.m.

CDC Epidemiology and Control of Vector-Borne Diseases Course No. 201, Atlanta, Ga., Feb. 16-20.

Connecticut Pest Control Assn.'s February Meeting, Connecticut Agricultural Experiment Station, New Haven, Feb. 17, 8 p.m.

Maryland Pest Control Assn.'s February Meeting, Southern Hotel, Baltimore, Feb. 19, 6:30 p.m.

Virginia Mosquito Control Assn. Annual Meeting, Suffolk, Feb. 24.

Alabama Pest Control Conference, Alabama Polytechnic Institute, API Campus, Auburn, Feb. 24-25.

Pacific Northwest PCO Tenth Annual Conference, Spokane, Wash., March 1-4.

Illinois Mosquito Control Assn. Annual Meeting, Southern Illinois University, Carbondale, March 2-3.

13th Annual Penna. State University PCO Conference, Pennsylvania State University, State College, March 3-5.

Iowa Pest Control Operators Assn. Spring Meeting, Iowa State College, Ames, March 5-6.

Northwest Pest Control Assn. One-Day Conference, Radisson Hotel, Minneapolis, Minn., March 6.

Central Midwest District Pest Control Meeting, Town House Hotel, Kansas City, Kan., March 9-10.

New Jersey Mosquito Extermination Assn. Annual Meeting, Hotel Haddon Hall, Atlantic City, March 18-20.

Virginia State Pest Control Assn. March Meeting, Hotel 2400, Washington, D.C., March 20-21.

American Mosquito Control Assn. Annual Meeting, Hotel Utah, Salt Lake City, U., April 12-15.

National Sanitary Supply Assn. 36th Annual Convention and Trade Show, Conrad Hilton Hotel, Chicago, Ill., April 12-15.

Chemical Specialties Manufacturers Assn. 45th Mid-Year Meeting, Drake Hotel, Chicago, Ill., May 18-20.

National Assn. of Sanitarians. 23rd Annual Educational Conference, Deauville Hotel, Miami Beach, Fla., June 22-26.

Sanitation Violators

Unlawful contamination of food and infestation of dwellings by insects and rodents is bringing seizures or condemnations by Federal, state and local enforcement authorities. Here are some of the latest violations and convictions.

A Madison, S. D. grocery firm was fined \$150 and its manager \$75 recently after rice and sugar in the plant were discovered to be contaminated with rodent filth and held under insanitary conditions.

In Zanesville, O., a food processing company and one of its owners were fined \$500 each for storing noodles and flour contaminated with insect and rodent filth, under insanitary conditions.

Beans contaminated with rodent filth and held under insanitary conditions brought a \$250 fine for a King City, Calif. warehouse company.

Two partners in a Des Moines, Ia. grocery company were fined \$500 each plus \$35 in costs recently for holding flour, contaminated with rodent filth, under insanitary conditions.

Flour contaminated with insect filth in an insect-infested bakery resulted in a \$250 fine for the bakery and a \$500 fine for its president. The bakery was located in Somerville, Mass.

A \$250 fine was levied against a candy manufacturing company in Salem, Mass. and its president was placed on probation for one year when candy in the plant was discovered to be contaminated with rodents and prepared under insanitary conditions.

A pickle company in Hayward, Calif., guilty of preparing insect-contaminated pickles under insanitary conditions, was fined \$250 recently. A partner also was fined \$250 and placed on probation for five years.

A Watsonville, Calif. bakery and a partner in the bakery were fined \$500 each when the company's flour was found to be contaminated with rodent filth.

Flour contaminated with rodent and insect filth and stored under insanitary conditions resulted in a \$200 fine for a Thomsville, Ga. grocery firm.

Peppers contaminated with insects resulted in a \$500 fine and a two-year probation for a Sacramento, Calif. pickle processor.

A \$1,000 fine was levied against a St. Paul, Minn. wholesale grocery firm and its manager was fined \$500 and placed on proba-

tion for one year for food sanitation violations. The conviction involved the holding of chili beans, contaminated with rodents and insects, under insanitary conditions.

A Sioux City, Ia. terminal warehouse company was fined \$200 recently and its president, \$25, when the warehouse was discovered to be rodent-infested while flour was stored there.

A \$625 fine was levied against a Decorah, Ia. food processor for contaminating sugar, flour, and cake mixes with insect and ro-

dent filth and holding these foods under insanitary conditions.

Test Rattler Repellent

Mercaptan, a chemical with an odor similar to that of a skunk, has been found effective in repelling rattlesnakes from camp or picnic sites and around homes. The University of California and Richfield Oil Corp., which are jointly supporting research on the chemical, report mercaptan soaked into bits of charcoal repels rattlers, won't annoy humans.

It "Stole" The Show



The YORK New Handy Linear Footage Estimator

Gives estimations of areas for termite elimination; indoors for carpet beetle rug-work; fumigations, lawn care or wherever linear footage is important.

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This amazing piece of equipment literally stole the National Pest Control Association Show in Washington, D.C. this past October. Now being offered to the Pest Control industry exclusively by York Chemical Company.

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2 Papers in Ent Journal Pertinent to the PCO

Two articles that should appeal to PCOs are carried in the October 1958 issue of the "Journal of Economic Entomology," Vol. 51, No. 5. One covers "The Biology of the Brown-Banded Cockroach and its Relative Susceptability to Five Organic Insecticides" (pp. 608-610); the other, "Studies of Mediterranean Fruit Fly Lures in Florida" (pp. 679-682).

The first paper on biology and

control of brown-banded roaches was prepared by George Hull, Jr. and Ralph H. Davidson of Ohio State University, Columbus. In it, the authors describe their studies on life stages of *Supella supellectilium* and control achieved on females of the species with emulsions of heptachlor, lindane, aldrin, chlordane, and DDT. Each toxicant was prepared in an emulsion of 25% deobase, 75% water, and 3 drops of Triton X-100 (per 25 cubic centimeters of deobase).

Results of these control tests show the brown-banded roach

does not differ greatly in susceptibility from the German roach (*Blattella germanica* (L)). Based on LD₅₀ and LD₉₀ obtained in the tests, the five compounds were listed according to effectiveness in the following descending order: lindane, heptachlor, aldrin, chlordane, and DDT.

The paper on Mediterranean fruit fly lures in Florida was written by W. A. Simanton, University of Florida, Citrus Experiment Station, Lake Alfred. The lures he covers are angelica seed oil; and synthetic esters of 6 methyl cyclohexene carboxylic acid, the secondary butyl ester (ENT 21486, now named siglure) and the isopropyl ester (ENT 21478).

Offer Home Sanitation Course

The National Sanitary Supply Association has prepared a 13-lesson home study course to help personnel engaged in plant sanitation to cut maintenance costs, increase safety and efficiency, and improve appearance of their establishments. PCOs might find the course useful for their serviceman training programs.

Called "Modern Cleaning Methods," the course was compiled with the help of leading sanitarians, efficiency experts, and manufacturers and distributors of sanitary supplies and equipment.

Lessons cover: "Planning an Efficient Cleaning Program; Bacteriology; Communicable Diseases; History of Sanitation I and II; Personal Hygiene; Facts About Brushes; Washing Windows, Walls and Ceilings; Sanitation Chemistry I and II; Metal Cleaning; Facts About Wax; and Floor Care."

For more details, write the NSSA at 159 N. Dearborn St., Chicago 1, Ill.

Reprint Chemical Hazard Report

Reprints of an article on "Morbidity and Mortality from Economic Poisons in the United States," which appeared in the August 1958 issue of the American Medical Association "Archives of Industrial Health," are now available from the AMA, 535 N. Dearborn St., Chicago 10, Ill.

The eight-page article is the latest report in a series of AMA studies on health hazards of pesticides.

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Notebook

TIPS AND IDEAS FROM THE FIELD

Cold-Blooded Termites

by G. Earl Huff

Assistant Entomologist
State of Indiana, Indianapolis

Every once in awhile our office gets calls relating to pest control and we do our best to help.

Not too long ago a restaurant equipment and supply store manager asked us to investigate some flying termites and if possible find the source of trouble.

On examination it appeared the termites were coming from under the floor, but a look downstairs in the basement showed no signs of an infestation there or in any other place. We advised the store owner to wait a few days and watch for more termites since only a few were coming out at the time.

Later, with warmer weather, the termites began to emerge in great numbers, and we were notified. Apparently they were coming from under a second-hand refrigerated self-service display case. Further investigation showed the termites had established themselves in the display case and were using the moisture in the bottom of the case, caused by leakage, to maintain a colony. We moved the case and found no evidence of termites in the floor beneath it.

For treatment we advised the store owner to remove the display case to the warehouse and remove the bottom boards. It was then treated with chlordane and left to dry. The owner was advised to have the leak repaired to prevent further favorable moisture conditions for the termites if the case was to be used again.

I was very pleased to learn this man has called in a local PCO who looked the place over very thoroughly and found nothing to suggest termites but the winged form flying around. The PCO, therefore, had advised that at the present it was his opinion the building did not need treating.

Clark Elected MGK President

Carroll A. Clark, vice president and general manager of McLaughlin Gormley King Co. since 1947, has been named MGK's president. Elected at a Board of Directors meeting late in November, he succeeds George A. McLaughlin, who becomes Chairman of the Board.

CDC Resistance Reprint

"The Status of Insecticide Resistance in Arthropods of Public Health Importance in 1956" is described in an 11-page reprint available from the Technical Development Laboratories, Communicable Disease Center, P.O. Box 769, Savannah, Ga.

Written by the CDC's Kenneth D. Quarterman and H. F. Schoof, the paper was originally published in the January 1958 issue of the American Journal of Tropical Medicine and Hygiene, Vol. 7, No. 1. It isolates particular cases

of physiological and behavioristic resistance in arthropod species throughout the world. When writing request Reprint No. 223.

Fire Ant, Cut-Ant Booklet

A new booklet entitled "Pestmaster Soil Fumigant-1 for Control of Imported Fire Ants and Cut-Ants" is available free from Michigan Chemical Corp., Saint Louis, Mich.

Directions are given in the booklet for the use of Pestmaster Soil Fumigant-1 as a control weapon for these ants.

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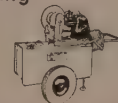
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Serviceman Training Outline: 2

by Robert E. Berns

Aerosol Exterminators, Chicago, Illinois

Serviceman training can be one of the most important factors in the success or failure of a pest control firm. Without properly planned, coordinated instruction, a serviceman can seriously cripple the prestige and income of his company.

Below is the second of 10 monthly training outlines to help you instruct your men more effectively in the fundamentals of pest control. Only those pests encountered on general service contracts are covered in the series. However, the PCO can add other more specialized classes to his schedule as he sees the need and depending upon localized problems. To get peak value from the series, the PCO must supplement classroom instruction with practical, in-the-field training so the service recruit can see exactly how to apply his new knowledge. Once the foreman decides the serviceman is ready to go out on his own, the PCO can spend a day in the field with the new man, then give him a final written examination. If he passes it, he should be ready to handle regular service work.

Serviceman's Function

Scheduled For (Date and Place)

References

Servicemen's Manual, Ch. 1, 4, 5, & 6.
National Pest Control Association, 250
West Jersey St., Elizabeth, N.J. (members
only).

Materials

1. Company contract forms, business cards, route cards, route slips
2. Model service kit with sprayers
3. On-the-job photos of company servicemen

LESSONS

- Jan.: Introduction, Background
- ✓ Feb.: Serviceman's Function
- Mar.: What Is An Insect?
- Apr.: Insecticides, Rodenticides
- May: Rat & Mouse Control
- Jun.: Roaches & Their Control
- Jul.: Bedbugs & Their Control
- Aug.: Silverfish & Their Control
- Sept.: Ants & Their Control
- Oct.: Don't Be Half Safe!

4. Blackboard, chalk

Object

To teach the serviceman his allied responsibilities

Method

Explain objectives, functions. Show use of forms and tools

Presentation

1. Write and recite the serviceman's code (Manual)
2. Tell the importance of good first impression — correct appearance and demeanor
3. An interesting job of benefit to humanity. Public health aspects, protecting health, conserving property
4. Tell "do's" and "don'ts"
5. Show and discuss forms
6. Show and discuss on-the-job equipment, its care
7. Basic steps of inspection, identification, recommendation, treatment

Demonstration

1. Perform the steps involved in treating a typical job (By service foreman)

Examination

1. Oral questions on conduct and demeanor, care of equipment

Issues MB Residue Tolerances

A complete list of agricultural commodities and the established tolerances for inorganic bromide residues resulting from methyl bromide fumigation is available from Agricultural Chemical Sales Dept., Dow Chemical Co., Midland, Mich.

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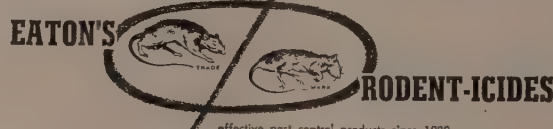
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763 Koppers Bldg., Pittsburgh 19, Pa.

Geigy Markets New Herbicide

The availability of Atrazine 50W herbicide for non-selective or industrial weed control on non-cropped land has been announced by Geigy Agricultural Chemicals, division of Geigy Chemical Corp., Ardsley, N. Y.

The new triazine compound, a 50% wettable powder, is said to control annual broadleaf weeds and grasses and many perennial weeds; may be applied either before weeds emerge or within several weeks following emergence. Although there is some herbicidal activity through foliage contact, Atrazine 50W acts mainly through the roots, according to the manufacturer. Therefore, it is dependent upon adequate rainfall to carry it to the root zone.

The manufacturer considers the compound a valuable addition to its Simazine 50W herbicide, which was introduced for industrial weed control two years ago and intended principally for application from late fall to early spring. The new product, Atrazine 50W, is said to be effective from late spring through early summer. This would give a com-

plete year-round program for industrial weed control.

Atrazine 50W also is reportedly non-flammable, low in electrical conductivity, non-corrosive, and easily flushed from sprayer equipment with water. Because it is low in toxicity to man and animals, it does not require the use of special protective clothing, the manufacturer claims.

Automatic Preshur-Mite Returns

Ewing Manufacturing Co., Jackson, Miss., has brought back its Automatic Preshur-Mite portable termite treating pump, a line which was discontinued four years ago when the new unstable water based chemicals became widely used. Recent improvements in these chemicals reportedly make most of them suitable now for application with the Automatic Preshur-Mite. Electrically powered and designed for use with any type solution container, the 127-pound pump is said to have a capacity of 5 gallons per minute, and an adjustable pressure to 225 p.s.i. It is fully automatic, cuts on and off as the chemical is used, and handles non-abrasive oil or

water base chemicals that stay in solution without agitation, according to the manufacturer.

For more information on the pump, write Ewing Manufacturing Co., P. O. Box 1986, Jackson 5, Miss.

New Rodent Control Film

A new color and sound movie on rat and mouse control is in production through a project sponsored cooperatively by the U. S. Fish & Wildlife Service, the Purdue University Agricultural Extension Service, and the Purdue Audio-Visual Center. It was anticipated the film would be available by the end of last year and scheduling will be on a first-come, first-served basis. For more information write W. D. Fitzwater, Agricultural Experiment Station, West Lafayette, Ind.

Aldrin, Dieldrin Namesakes

Aldrin and dieldrin derive their names from two German winners of the Nobel prize. The two researchers devised the Diels-Alder reaction, a process used in the synthesis of these chemicals.

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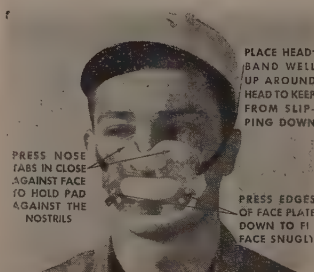
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Rat 10"	\$ 8.00	Old House Borer	
Rat 15"	9.50	Larvae	11.00
Fly	10.00	Butterfly Pins, Gross	2.50
American Roach	9.00	Assorted Bug Brooches	
Oriental Roach	8.50	gr.	10.50
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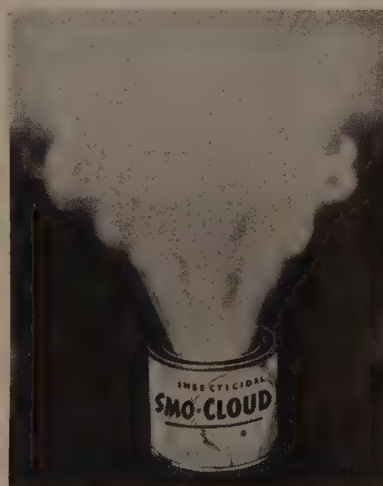


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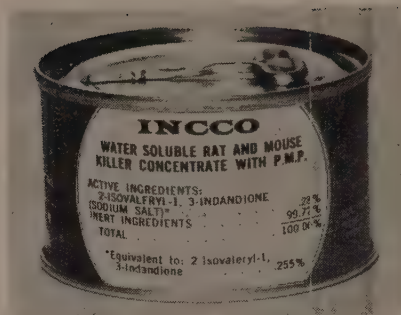
PC

Aramite Fruit, Vegetable Tolerance Dropped to Zero

The Food and Drug Administration has lowered to zero the residue tolerance of Aramite, a miticide, permitted on fresh and raw fruits and vegetables.

This action, said by some to rule Aramite off the market as a chemical pesticide, was reportedly prompted by a report on animal feeding studies submitted by Aramite's manufacturer, the Naugatuck Chemical Division of the United States Rubber Co., Naugatuck, Conn. The report showed, according to the FDA, that cancer was caused in dogs fed Aramite at levels as low as 500 parts per million. The FDA also indicated that Aramite has produced cancer in rats.

A representative for Naugatuck Chemical says, however, that the FDA decision does not ban Aramite from the market. The company is now advising applicators to use the chemical on edible crops only during the early growing season so the chemical residue will be zero when they are harvested, the spokesman said.



A free sample of INCCO water-soluble anticoagulant rodenticide is being offered by Inland Chemical Corp. in a pre-portioned 1-2/3 ounce container that is hermetically sealed. INCCO is available as dry and water soluble concentrates, tracking powder, and as a double purpose Universal Concentrate. For a sample of the water soluble form and further details, write Inland Chemical Corp., 415 Lexington Ave., New York 17, New York.

Penick Opens PCO Dept.

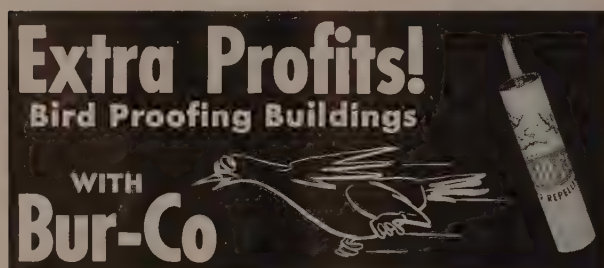
Formation of a new Pest Control Supply Department has been announced by S. B. Penick & Co., 100 Church St., New York 8, N.Y. Among other services, the new department offers PCOs technical bulletins and special pre-printed forms to simplify ordering. Shipments will be dispatched within 24 hours after they are received, Penick says.

Copies of J. J. Davis Memoirs Available

Professor Emeritus J. J. Davis of Purdue University's Department of Entomology, one of the early educators who helped guide the technical development of the pest control industry, has published his memoirs. Copies of his memoirs, entitled "Memories of Years Agone — Mostly Entomological," can be obtained by writing Professor Davis at the Department of Entomology, Purdue University, Lafayette, Ind. The publication was made possible through financial help of Chicago PCO, Harold E. Jennings.

Fairfield Acquires Powco

Fairfield Chemical Division, Food Machinery and Chemical Corp., has announced the acquisition of POWCO inventories from the Olin Mathieson Chemical Corp., together with the POWCO trademark. Dr. Alfred Weed, formerly with Mathieson, has joined Fairfield as a consultant and assistant to John A. Rodda, manager of Fairfield Chemical whose office is in New York.



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Bur-Co is a chemical bird repellent, guaranteed to keep birds away from ANY building, when used according to instructions. Eliminates unsightly — and damaging — bird droppings. Non-harmful to humans or birds. Does not damage buildings . . . replaces expensive, hard to install mechanical devices.

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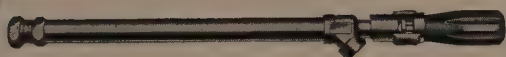


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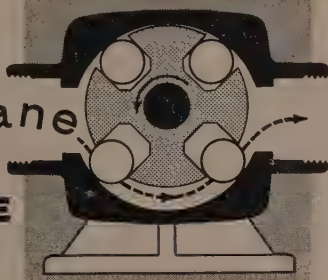
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UP TO 150 PSI

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Rapidly expanding pest control firm requires high-type man to manage offices. Must have initiative, sales ability and forcefulness. Prefer graduate entomologists with practical experience. Will also consider applications from men now in the pest control field, who possess good education, sound technical and business background. Excellent opportunity to become associated with progressive organization enjoying solid financial position. Salary and percentage. Submit complete data: age, education, experience and other pertinent details, together with photo. All replies strictly confidential.

L. L. Crosby, President

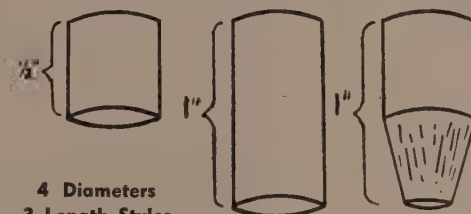
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When answering ads where box number only is given, please address as follows: Box number, c/o Pest Control, 1900 Euclid Avenue, Cleveland 15, Ohio.

Rates: "Position Wanted" 5c per word, minimum \$2.00. All other classifications, 10c per word, minimum \$2.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment.

POSITION WANTED

ENTOMOLOGIST — wide experience and responsibilities in pest control operations. Desires technical or managerial position in pest control or allied fields. Southern or southwestern location preferred. Correspondence confidential. Box 492, Pest Control magazine.

HELP WANTED

TECHNICAL DIRECTOR—We have a very important position for an outstanding man, with entomological and chemical background and a record of successful accomplishment, to head service department of rapidly expanding pest control firm with home offices in Pittsburgh. This is an important position for a man with experience and possessing managerial ability plus. Remuneration to meet expectations plus opportunity for profit-sharing interest. This is an unusual opportunity for the right man. All replies strictly confidential. Submit account of academic and professional training, past affiliations, earnings, photo and any other pertinent facts to: L. L. Crosby, President, Commonwealth Sanitation Co., 3567 Bigelow Blvd., Pittsburgh 13, Pa.

TECHNICAL PERSONNEL wanted by large service-minded company. Duties to assist branch offices in pest and termite control services. Some travel and no sales required. Degree helpful but not essential. Benefits include life insurance, hospitalization, pension, paid vacation, and sick leave. Ample opportunity for advancement. Send resume including salary history. All replies confidential. Interviews in Atlanta by invitation at our expense. Write in detail to Orkin Exterminating Co., Inc., 713 W. Peachtree St., Atlanta, Ga. Attention: Technical Dept.

OPPORTUNITIES UNLIMITED. The world's largest pest control organization (AAA-1 rated) has interesting openings for men with initiative and ambition. We operate in 28 states from coast to coast and there are opportunities open in many phases of our operation . . . servicemen, managers, technical representatives and salesmen. Experience in professions related to pest control helpful, though not necessary. Liberal salary and incentive arrangements

provide unparalleled opportunities for men with good judgment and the ability to get along with people. Our firm, over 50 years old, offers employee benefits including paid vacations, sick leave, life insurance, hospitalization and pension plan. All replies confidential. Interviews in Atlanta by invitation at our expense. Write in detail to Orkin Exterminating Co., Inc., 713 W. Peachtree St., Atlanta, Ga. Attention: Personnel Dept.

FLORIDA CERTIFIED pest control operator wanted for unusual opportunity in responsible position. All replies confidential. Interviews in Tampa at our expense. Terminix Company, 3432 South Dale Mabry, Tampa, Fla.

WANTED: MANAGERS for branch offices. Rapidly expanding pest control firm requires high-type men to manage offices. Must have initiative, sales ability, and forcefulness. Prefer graduate entomologists with practical experience. Will also consider applications from men now in the pest control field, who possess good education, sound technical, and business background. Excellent opportunity to become associated with progressive organization enjoying solid financial position. Salary and percentage. Submit complete data: age, education, experience, and other pertinent details, together with photo. All replies strictly confidential. L. L. Crosby, President, Commonwealth Sanitation Co., 3567 Bigelow Blvd., Pittsburgh 13, Pa.

WANT TO BUY

WILL PAY TOP PRICE for exterminating business in New York City area. Cash. Replies confidential. Box 439, Pest Control magazine.

INTERESTED in buying exterminating business in Chicago or Kansas City. Replies confidential. Box 486, Pest Control magazine.

PEST CONTROL BUSINESSES in New York State, New Jersey, Pennsylvania, Massachusetts, and Connecticut. McMahon Brothers, Inc., P.O. Box 34, West View Station, Binghamton, N. Y.

WILL BUY pest control business in Pennsylvania, Ohio, Kentucky, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, and West Virginia. Write details to R. D. Erdie, 410 Ogden Ave., Fairmont, W. Va.

WILL PURCHASE OUTRIGHT or make special deal to operate any extermination or termite business in or around Philadelphia, Pa. Box 493, Pest Control magazine.

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EFFECTIVE TO USE — Follow instructions on can for best results. This Amazing **FUMO-KILL** insecticide is by all qualifications, a leader in its field.

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Bulk . . . \$ 4.50 per lb.

Delivery Charges Prepaid
For complete information write or phone today.

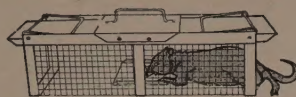
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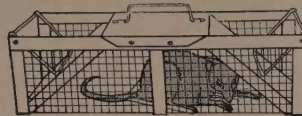
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WE HAVE THE COMPLETE LINE OF HAYHART TRAPS



Open at both ends. Animal walks in unsuspectingly



Both ends shut. The animal is caught unhurt

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RATS, SQUIRRELS,
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Complete line of hand, continuous, compressed air, knapsack, bucket, wheelbarrow and barrel sprayers and insecticide dusters. Many styles of spray nozzles. Quality design and performance.

Streamlined BLIZZARD Copper Continuous Sprayer

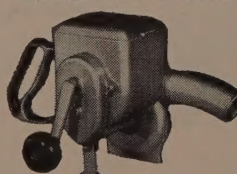


World's Finest
Two Sizes: Pint,
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Solid copper tank. Seamless, highly polished brass pump barrel. Beautiful design. Sturdy construction. Lasts for years. Double nozzle sprays fine, powerful mist straight ahead or at any angle.



PESTMASTER DUSTER



World's lightest, easiest working insecticide duster. Weighs 1 1/4 lbs. Non-rust, all metal construction. Throws 8 ft. dust stream. Nothing matches it. Very popular.

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2 Gal., compact compressed air sprayer. Dome top welded tank. 5 ft. hose. 16" curved brass extension. Brass adjustable nozzle. Very popular. Light and easy to use.



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Pestales

Builds future PCOs. There are a lot of ways to stimulate an entomological interest in youngsters, but Bob Berns of Chicago's Aerosol Exterminators has hit upon one of the better ideas we've heard. He recently sponsored an Insect Collection Contest in co-operation with Chicago's North Shore area schools, awarded a 14-year-old first prize winner a four-volume library of the natural sciences, donated by Mercury Chemical Co., Chicago, and a professional insect collection display case, given by Ward's Natural Science Establishment, Inc., Rochester, N.Y. The 16-year-old high school

junior who won second place received a copy of Metcalf, Flint & Metcalf's "Destructive and Useful Insects," donated by Olin Mathieson Chemical Corp., Baltimore, plus a membership to the Chicago Natural History Museum, sponsored by the Commerce Petroleum Co., Chicago. Third prize winner also received a membership to the Chicago Natural History Museum. At the awards ceremony, Bob managed to squeeze in a not-unsubtle plug on the opportunities in the U.S. for trained entomologists in all areas of the natural science field.

When courtesy doesn't pay. Switchboard operators with Drop Dead Insecticide Co., Los Angeles, Calif., have been instructed to use the full corporate title

of the company from now on when answering telephone calls. Too many potential customers got huffy when the otherwise cheery little voice on the other end of the line snapped: "Drop Dead!"

"Branch" market. Truly Nolen of of Truly Nolen Exterminators, Miami, Fla., has a brand new title now — at least for readers of "The 65 Magazine," a newsy little periodical published in Quakertown, Pa. for retirement-age folks. In the mag's December issue, Truly was dubbed "The Christmas Tree King." Seems every year around the Yule, Truly takes to the Canadian woods to choose, mark, and arrange for the shipment of Christmas trees to his 12 lots in the Miami area. For 1958, he bought ten carloads of handpicked spruce with between 1,500 and 2,300 choice trees in each load. December may be a slack month for pest control service, but not for Christmas trees.

Communists, yes; but flies, no. Most flies on the Chinese mainland have either been killed off by an organized swatting campaign or they have escaped to the Nationalist-held island of Formosa, according to one Communist report. The Reds are probably hoping about now the flies won't take Ching Kai Shek's "resistance" talk too seriously.

PCO on ice. Bill Mongeau of Worcester, Mass.'s Pied Piper Service hit local headlines in a big way before the New Year. In a dramatic, three-column spread, the "Worcester Telegram" described how Bill slithered on his stomach across 20 feet of thin ice (he's a husky 230 pounds) to rescue a 12-year-old boy who had tumbled into a pond when the ice gave way under him. Bill, who was New England district governor for Kiwanis International in 1955, dismissed his deed lightly, awed reporters with an off-hand: "Well, this takes care of my activity in boy and girl work for December."

Mosquito pills. In the medical world, a doctor reports the latest remedy for mosquito bites is an antihistaminic pill that doesn't cure the bite, only relieves the itching. But there's a catch: the bite victim who gobbles down the pill will usually get sleepy. *Maybe while you sleep off the pill, you sleep off the itch.*

Ivan M. Root dies. Ivan M. Root of Dayton's Root Termite Service, a termite operator in and around Dayton, Ohio, for 20 years, passed away December 4 after a long illness. Mr. Root's widow and Charles Hart, his assistant for the last 15 years, will continue to manage the business.

King of beasts. A rat caused the death of a nine-year-old elephant in the Tokyo Zoo several weeks ago. Panicked at the sight of the rat, the pachyderm fell into a ditch surrounding its enclosure, receiving severe injuries that were later fatal.

CHAPIN'S THE LINE FOR '59 IN LAWN AND GARDEN SPRAYERS



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NEW WIDE DIAMETER

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Most sales-stimulating innovation in years in lawn and garden sprayers! Chapin's new wide-diameter compressed air sprayer in a complete range of capacities! Larger diameter and lower height add greater balance and stability, new carrying convenience, modern appearance. SAME dependable Chapin quality and performance. Two-stage safety lock. Oil-resistant hose, gasket, valves.

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◀ Compare this new wide-diameter Model No. 141 with this old-style small diameter Model No. 140 ▶

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BATAVIA, N.Y. Dept. 4

Perfect Combination

Now, Crag[†] Fly Repellent With Pyrenone^{*} For All Dairy and Livestock Applications

It's a perfect combination because Crag Fly Repellent has recently been granted broad USDA approval under the Miller Bill.

You can even apply Crag Fly Repellent, either alone or in combination with Pyrenone, directly to dairy and beef cattle—on a "no residue" basis. (That's the acid test of *low* toxicity. A test, incidentally, that Pyrenone passed with flying colors some years ago.)

Pyrenone controls fly populations. Crag Fly Repellent repels new invasions. When you combine the two in the same formulation, you get a one-two combination that's hard to beat.

Crag Fly Repellent also extends and improves the effectiveness of residual toxicants. Like always dependable Pyrenone, Crag Fly Repellent is decidedly economical, too.

Today Fairfield Chemicals offers you

Pyrenone plus Crag Fly Repellent in oil-base or emulsifiable concentrates. Or if you prefer to make your own combinations, you can also obtain Crag Fly Repellent from our regional offices.

A new Technical Data Sheet entitled "Pyrenone-Repellent Combinations" is immediately available. For your copy, including complete price information, contact your nearest Fairfield representative today. Branches in principal cities. In Canada: Natural Products Corporation, Montreal and Toronto.

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REPELLENTS

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This powerful insecticide is tailor-made for termite control. Once it's applied, dieldrin forms a deadly barrier that knocks out termites, coming and going.

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And dieldrin is economical. Small dosages go a powerful long way.

Boost customer satisfaction and sales. Use alkali-stable dieldrin in all your

termite control operations. You can guarantee every dieldrin job with confidence. This same powerful insecticide can be used to control many other insects, both indoors and out.

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